KING EDWARD VI
HANDSWORTH GRAMMAR
SCHOOL FOR BOYS

KING EDWARD VI
ACADEMY TRUST
BIRMINGHAM

Year 7

2023 Mathematics 2024

Unit 4 Tasks – Part 1

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KING EDWARD VI
HANDSWORTH GRAMMAR
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Unit 4 Tasks – Part 2

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ACADEMY TRUST
BIRMINGHAM

Year 7

2023 Mathematics 2024

Unit 4 Tasks – Part 3

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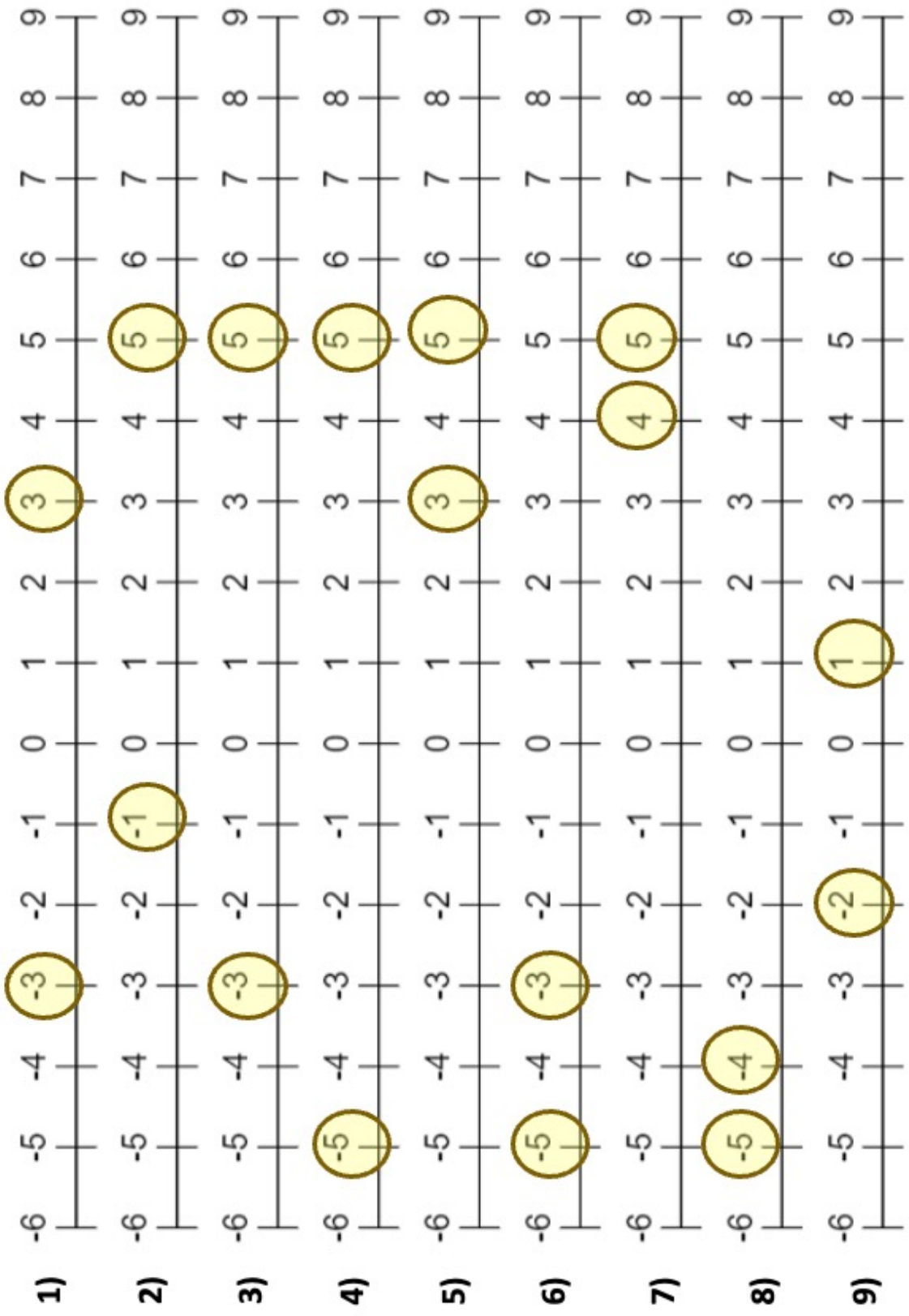
Contents

1 Rounding

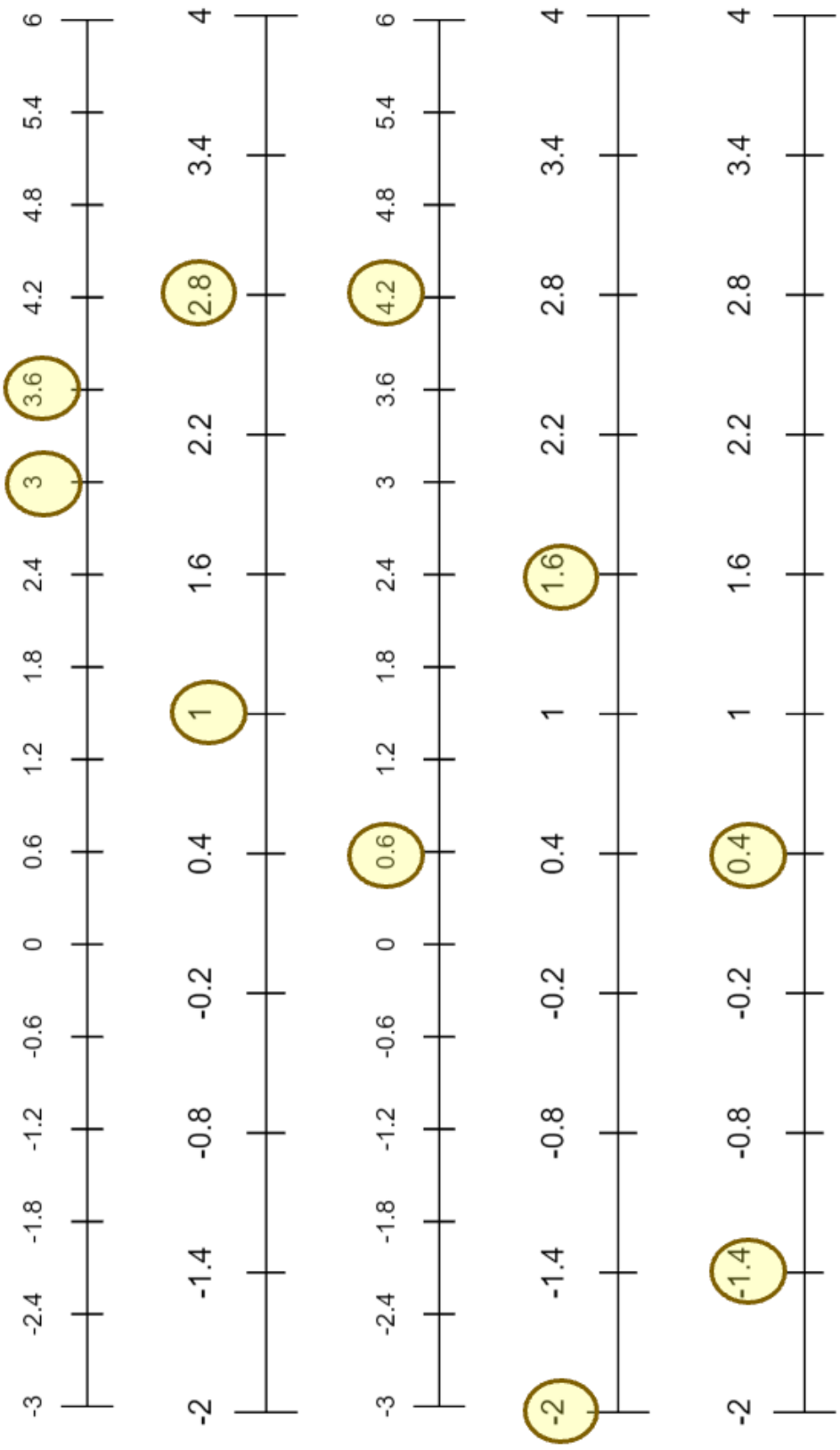
Intelligent Practice

Find the midpoints of the circled numbers on each number line.



Intelligent Practice

Find the midpoints of the circled numbers on each number line.



Intelligent Practice

Round:

1) 73 to the nearest 1
2) 73 to the nearest 10
3) 73 to the nearest 100
4) 73 to the nearest 50
5) 73 to the nearest 25
6) 73 to the nearest 5
7) 73 to the nearest 2
8) 73 to the nearest 4
9) 73 to the nearest 3
10) 73 to the nearest 0.5
11) 73 to the nearest 1.5
12) 73 to the nearest 7.3

Round:

1) 75 to the nearest 1
2) 75 to the nearest 10
3) 75 to the nearest 100
4) 75 to the nearest 50
5) 75 to the nearest 25
6) 75 to the nearest 5
7) 75 to the nearest 2
8) 75 to the nearest 4
9) 75 to the nearest 3
10) 75 to the nearest 0.5
11) 75 to the nearest 1.5
12) 75 to the nearest 7.5

1) Round 17 to the nearest 6.

2) Round 17 to the nearest 8.

3) Round 17 to the nearest 5.

4) Round 17 to the nearest 2.

5) Round 59 to the nearest 7.

6) Round 58 to the nearest 7.

7) Round 60 to the nearest 7.

8) Round 61 to the nearest 7.

9) Round 53 to the nearest 5.

10) Round 53 to the nearest 11.

11) Round -7 to the nearest 3.

12) Round -12 to the nearest 5.

13) Round -3.987 to the nearest 5.

14) Round -3.987 to the nearest 8.

15) A number has been rounded to 20 to the nearest 10. What are the integers values for this number?

16) A number has been rounded to 20 to the nearest 5. What are the integers values for this number?

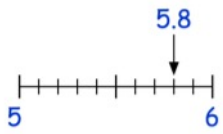
17) A number has been rounded to 20 to the nearest 4. What are the integers values for this number?

18) A number has been rounded to 20 to the nearest 6. How do you know a mistake has been made?

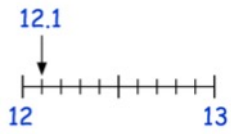
Fluency Practice

Question 1: Round each of the numbers below to the nearest whole number.

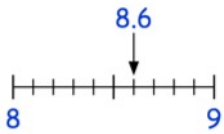
(a) 5.8



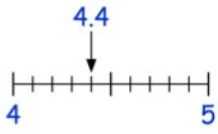
(b) 12.1



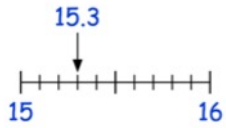
(c) 8.6



(d) 4.4

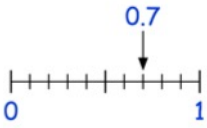


(e) 15.3

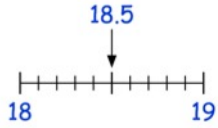


(f) 325.9

(g) 0.7



(h) 18.5



Question 2: Round each of the following numbers to the nearest whole number.

(a) 7.2 (b) 1.9 (c) 14.3 (d) 9.4 (e) 27.8 (f) 19.1 (g) 50.6

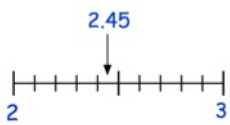
(h) 154.7 (i) 200.5 (j) 334.6 (k) 99.9 (l) 840.4 (m) 1981.6 (n) 245.3

Question 3: Round each of the numbers below to the nearest whole number.

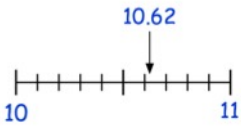
(a) 8.15

(b) 3.92

(c) 2.45



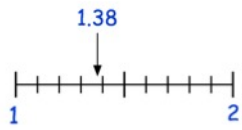
(d) 10.62



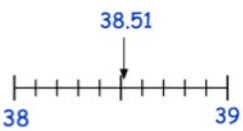
(e) 17.84

(f) 52.09

(g) 1.38



(h) 38.51



Question 4: Round each of the following numbers to the nearest integer (whole number).

(a) 4.11 (b) 6.74 (c) 2.91 (d) 9.46 (e) 8.27 (f) 6.34

(g) 13.89 (h) 16.08 (i) 42.63 (j) 29.54 (k) 38.15 (l) 103.46

Question 5: Round each of the following numbers to the nearest integer (whole number).

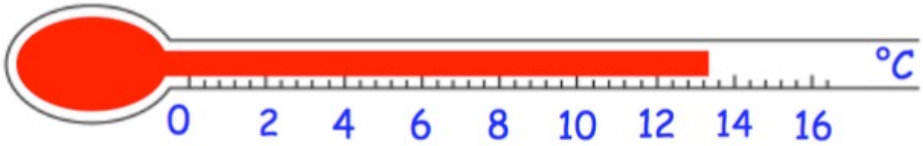
(a) 48.394 (b) 7.651 (c) 8.909 (d) 32.488 (e) 838.099 (f) 573.5619

(g) 15.6001 (h) 144.4998

Extension

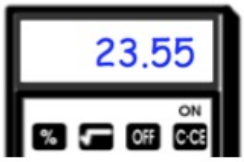
Question 1: A cupcake contains 4.6g of protein.
Round 4.6g to the nearest whole number.

Question 2: The thermometer shows the temperature in a town.



(a) Write down the temperature
(b) Round the temperature to the nearest degree celsius.

Question 3: Georgia has divided 2355 by a number on her calculator
The calculator shows the answer.



(a) What number did Georgia divide 2355 by?
(b) Round her answer to the nearest integer

Question 4: Derek wants to round 8 hours and 45 minutes to the nearest hour.
He says the answer is 8 because 8.45 rounds to 8.
Explain why Derek is wrong.

Question 5: Jurgen has rounded a number to the nearest whole number.
His answer was 600.
Write down 5 different possible numbers that he could have rounded.

Fluency Practice

Question 1: Round the following numbers to the nearest 10

(a) 32	(b) 67	(c) 71	(d) 24
(e) 59	(f) 92	(g) 16	(h) 83
(i) 17	(j) 14	(k) 78	(l) 43
(m) 84	(n) 27	(o) 25	(p) 41
(q) 75	(r) 33	(s) 95	(t) 98
(u) 19	(v) 99	(w) 62	(x) 54
(y) 15	(z) 74		

Question 2: Round the following numbers to the nearest 10

(a) 121	(b) 146	(c) 164	(d) 185
(e) 292	(f) 238	(g) 312	(h) 333
(i) 845	(j) 582	(k) 233	(l) 167
(m) 596	(n) 705	(o) 502	(p) 993
(q) 998	(r) 1241	(s) 1628	(t) 1164
(u) 2673	(v) 6036	(w) 7555	(x) 8128
(y) 13821	(z) 29234		

Question 3: Round the following numbers to the nearest 10

(a) 24.2	(b) 61.9	(c) 76.8	(d) 26.4
(e) 14.7	(f) 231.8	(g) 185.3	(h) 201.5
(i) 78.38	(j) 135.14	(k) 141.97	(l) 164.89
(m) 4938.3	(n) 5141.49	(o) 15.455	(p) 1009.02

Fluency Practice

Question 4: Round the following numbers to the nearest 100

(a) 390	(b) 220	(c) 160	(d) 240
(e) 518	(f) 842	(g) 756	(h) 547
(i) 371	(j) 578	(k) 613	(l) 888
(m) 374	(n) 611	(o) 673	(p) 480
(q) 150	(r) 349	(s) 951	(t) 950
(u) 850	(v) 949	(w) 748	(x) 540
(y) 450	(z) 495		

Question 5: Round the following numbers to the nearest 100

(a) 1430	(b) 1280	(c) 1610	(d) 1550
(e) 4030	(f) 6080	(g) 7420	(h) 8160
(i) 3562	(j) 2415	(k) 8283	(l) 5858
(m) 9248	(n) 3358	(o) 4214	(p) 9987
(q) 13494	(r) 16148	(s) 13114	(t) 15832
(u) 26783	(v) 56862	(w) 45555	(x) 13668
(y) 489481	(z) 124346		

Question 6: Round the following numbers to the nearest 100

(a) 248.2	(b) 561.9	(c) 716.8	(d) 246.4
(e) 149.7	(f) 2315.8	(g) 1835.3	(h) 2061.5
(i) 2378.38	(j) 5135.14	(k) 9141.97	(l) 4164.89
(m) 44938.3	(n) 25141.49	(o) 1995.455	(p) 51009.02

Fluency Practice

Question 7: Round the following numbers to the nearest 1000

(a) 2300	(b) 5600	(c) 2900	(d) 8200
(e) 7200	(f) 8420	(g) 2780	(h) 4500
(i) 1930	(j) 6480	(k) 7710	(l) 5500
(m) 4951	(n) 7571	(o) 7456	(p) 5499
(q) 7395	(r) 3112	(s) 3661	(t) 5532
(u) 4945	(v) 9442	(w) 9550	(x) 9499
(y) 9934	(z) 7409		

Question 8: Round the following numbers to the nearest 1000

(a) 21800	(b) 18300	(c) 17600	(d) 19200
(e) 11590	(f) 16350	(g) 24500	(h) 34800
(i) 38434	(j) 84925	(k) 48358	(l) 56187
(m) 123940	(n) 293482	(o) 231184	(p) 563921

Question 10: Round the following numbers to the nearest 10000

(a) 39304	(b) 23424	(c) 44500	(d) 26492
(e) 26500	(f) 54588	(g) 62049	(h) 75000
(i) 418553	(j) 144503	(k) 185000	(l) 384458

Question 11: Round the following numbers to the nearest 100000

(a) 384000	(b) 129400	(c) 569000	(d) 812300
(e) 384984	(f) 750000	(g) 1284000	(h) 2840000

Question 12: Round the following numbers to the nearest 1000000

(a) 1492000	(b) 5600000	(c) 7308000	(d) 6670000
(e) 12800000	(f) 17450000	(g) 35700000	(h) 384728521

Extension

Question 1: 645 people attended a concert. Round this to the nearest 10.

Question 2: 861 students attend a school. Round this to the nearest 100.

Question 3: The cost of a laptop is £1348. Round this to the nearest £100.

Question 4: 24,812 people attended a football match. Round this to the nearest thousand.

Question 5: The population of a city is 85,398. Round this to the nearest thousand.

Question 6: The number of beads in a jar is 50 to the nearest ten.
(a) What is the minimum possible number of beads in the jar?
(b) What is the maximum possible number of beads in the jar?

Question 7: The number of students at a school is 1200 to the nearest 100.
What is the maximum possible number of students at the school?

Question 8: The population of a village is 900 to the nearest 100.
State if the following could be true or false:

(a) 890 people live in the village.
(b) 960 people live in the village.
(c) 912 people live in the village.
(d) 845 people live in the village.
(e) 850 people live in the village.
(f) 950 people live in the village.

Question 9: The value of a car is £7000 to the nearest thousand pounds.
(a) What is the least possible value of the car?
(b) What is the greatest possible value of the car?

Question 10: The number of people at a concert is 200 to the nearest 10.
(a) What is the least possible number of people at the concert?
(b) What is the greatest possible number of people at the concert?

Round the following numbers to the nearest integer:

(a) 4.2 (b) 4.8 (c) 4.28 (d) 4.82

(e) 2.3954 (f) 7.91843 (g) 6.40858135 (h) 9.0898767986…

(i) 3.14159265… (j) 12.74651245… (k) 154.9140108252…

(l) 19.99157235 (m) 30.63461572 (n) 5032.00724682…

(o) 3.4 (p) 3.49 (q) 3.499999999999999

(r) 3.51 (s) 3.501 (t) 3.5000000000000001

Fluency Practice

learn by heart

Sometimes we do not want to write all the digits of a decimal down and we can shorten it by rounding.

example

Round 6.83 to the nearest whole (integer)
= 7

An integer is a whole number.
6.83 has 6 wholes + some extra, so it is between 6 and 7 wholes.
Half way between 6 and 7 would be 6.5, and 6.83 is more than this, so it is closer to 7.

exercise 1o

1. Which of these numbers are **integers?** Choose all that apply.

   a) 45.8 b) 36 c) 2.83 d) 1.5 e) 2

2. Round each number to the nearest whole:

   a) 3.6 c) 2.3 e) 6.5

   b) 4.7 d) 14.9 f) 201.3

3. Round each number to the nearest integer:

   a) 2.68 c) 3.15 e) 14.782

   b) 4.79 d) 0.86 f) 156.345

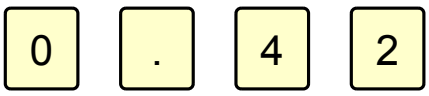
4. Complete the table:

Number	Nearest 10	Nearest 100	Nearest 1000	Nearest Whole Number
426.24				
690.104				

5. Find all the numbers that round to 17, to the nearest integer:

A 17.5	B 16.5	C 16.2	D 15.1	E 17.5	F 17.23
G 17.1	H 16.9	I 17.8	J 16.4	K 16.45	L 17.51

6. Arrange the cards to make a number that rounds to 21, to the nearest integer:



Fluency Practice

(1) Complete this table, rounding each number to appropriate degree of accuracy.

Number	Nearest 10	Nearest 100	Nearest 1000
56	*60*	*100*	*0*
75			
123			
149			
152			
501			
753			
1204			
3428			
5007			
6043			
8989			

rounding

Number	To the Nearest Ten	To the Nearest Hundred	To the Nearest Thousand
40,235	40,240		
40, 296		40,300	
41, 007			
40,478			
		41,900	42,000
	40,510		41,000

jumbled answers

Choose from the jumbled answers the correct numbers to make the table complete:

40,480	41,910
41,909	40,000
40,200	40,000
41, 760	40,514
41,000	40,000
41,010	41,000
41,800	40,500
40,500	41,757
42,000	40,300

Fill in the Gaps

Problem Solving

complete the table:

the difference is:
nearest 100 – nearest 10

number	nearest 100	nearest 10	difference
174	200	170	+ 30
438			
563			
218			
35			
923			
263			
871			

why are some differences the same?

what could the numbers be?

the difference is
nearest 10 – nearest 100

number	nearest 100	nearest 10	difference
			– 30
			– 50
			+ 50
			+ 10
			– 10
			+ 20
			0
49			
51			

what type of number has a difference of – 40 ?

Problem Solving

which 10 (whole) numbers round to 700 to the nearest 100 and 670 to the nearest 10 ?

which 5 (whole) numbers round to 300 to the nearest 100 and 250 to the nearest 10 ?

which 5 (whole) numbers round to 400 to the nearest 100 and 450 to the nearest 10 ?

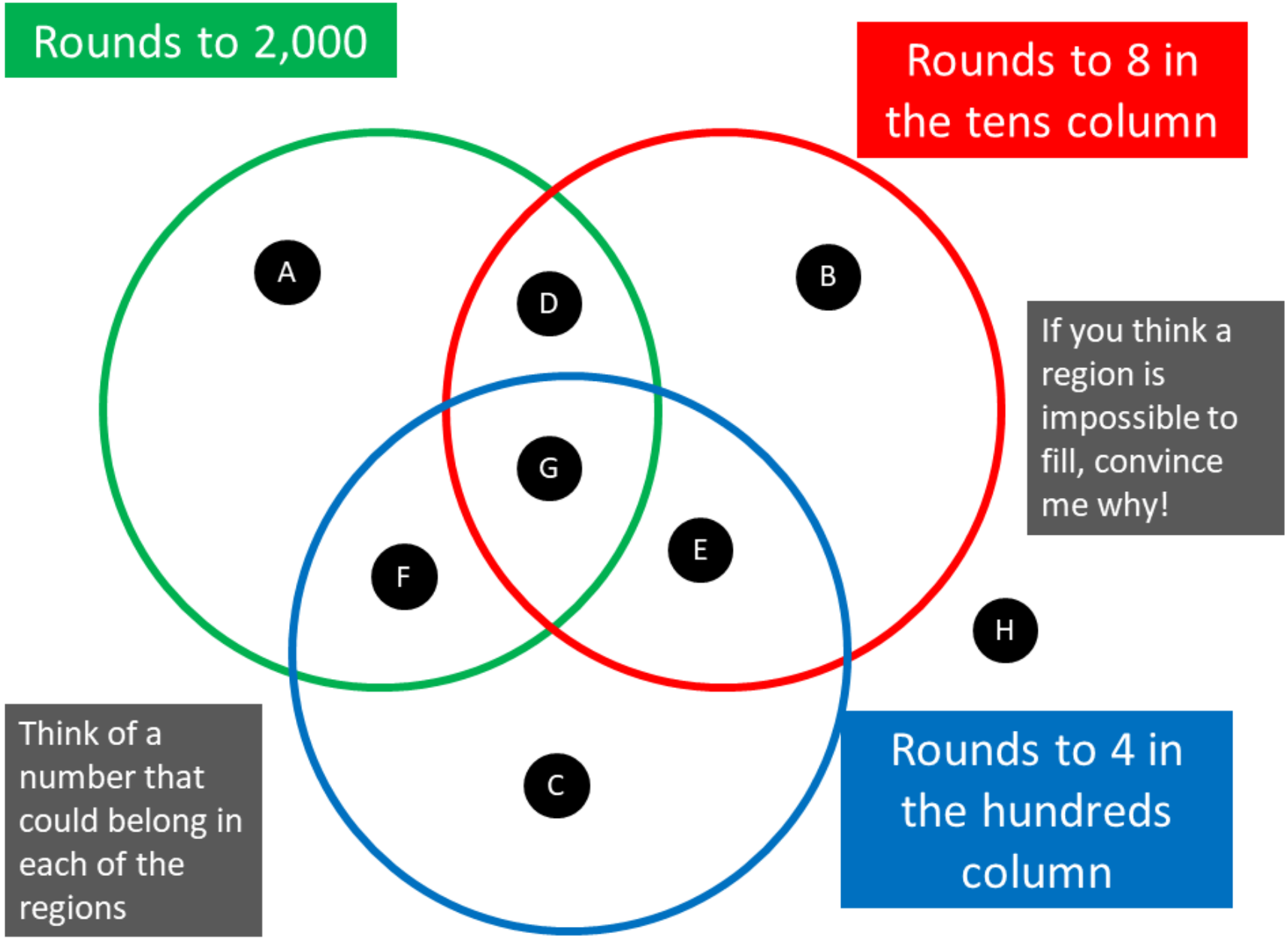
which 5 (whole) numbers round to 800 to the nearest 100 and 850 to the nearest 10 ?

the difference between two whole numbers is 2 when rounded to the nearest *100* the difference is 100 what could the two numbers be?

the difference between two whole numbers is 2 when rounded to the nearest *1000* the difference is 1000 what could the two numbers be?

the difference between two numbers is 0.2 when rounded to the nearest *ten* the difference is 10 what could the two numbers be?

the difference between two numbers is 0.02 when rounded to the nearest *unit* the difference is 1 what could the two numbers be?


Rounds to 2,000
Rounds to 8 in the tens column
A
D
B
G
F
E
H
C
If you think a region is impossible to fill, convince me why!
Think of a number that could belong in each of the regions
Rounds to 4 in the hundreds column

Intelligent Practice

Number	1 decimal place	2 decimal places	3 decimal places
0.1234			
0.2345			
0.3456			
0.4567			
0.04567			
0.40567			
0.45067			
9.45067			
9.45967			
9.95967			

Fluency Practice

(2) Complete this table, rounding each number to appropriate degree of accuracy.

Number	1 decimal place	2 decimal places	3 decimal places
5.6	*6.0*	*5.60*	*5.600*
7.5			
1.23			
1.49			
0.152			
1.5015			
1.2753			
0.1204			
2.3428			
12.5007			
1.6043			
9.9899			

Purposeful Practice

Rounding Square Roots

Use a calculator to find the square root of the number x each time.
Round your answers to 3 dp, 2 dp, 1 dp and to the nearest integer.
Round from the *original answer* each time and not from your previous rounding.

x	$\sqrt{x}$ (as on calculator)	3 dp	2 dp	1 dp	nearest integer
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

How many square roots are equal to 1 when rounded to the nearest integer?
How many round to 2?
How many round to 3?
Is there a pattern? How many do you think would round to 20?

Fluency Practice

Round to the nearest integer (whole number):

(a)	9.7	(b)	12.4
(c)	47.1	(d)	0.9
(e)	4.11	(f)	5.62
(g)	24.57	(h)	13.45
(i)	1.22	(j)	14.987

Round to 1 decimal place:

(a)	3.12	(b)	65.27
(c)	5.88	(d)	4.25
(e)	0.56	(f)	2.432
(g)	21.635	(h)	283.123
(i)	33.987	(j)	0.998

Round to 2 decimal places:

(a)	2.121	(b)	8.115
(c)	6.878	(d)	13.989
(e)	0.413	(f)	4.245
(g)	18.7354	(h)	0.9998
(i)	75.0123	(j)	1.7898

Round these numbers to the stated number of decimal places.

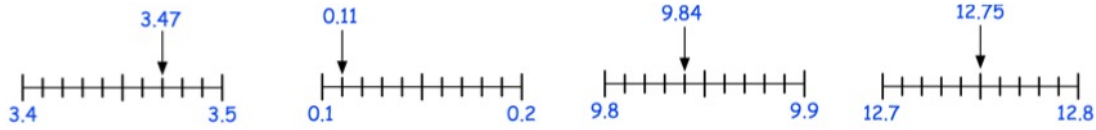
(a) 5.876 (1 d.p.)
(b) 4.237 (2 d.p.)
(c) 0.6754 (2 d.p.)
(d) 12.96 (1 d.p.)
(e) 4.302 (1 d.p.)
(f) 5.999 (2 d.p.)

(a) The width of a book is 21.7 cm correct to 1 decimal place. What is the smallest and biggest width the book could have?
(b) A pencil has a length 16.25 cm, correct to 2 decimal places. What is the smallest and biggest length the pencil could have?

Fluency Practice

Question 1: Round each of the numbers below to 1 decimal place.

(a) 3.47 (b) 0.11 (c) 9.84 (d) 12.75



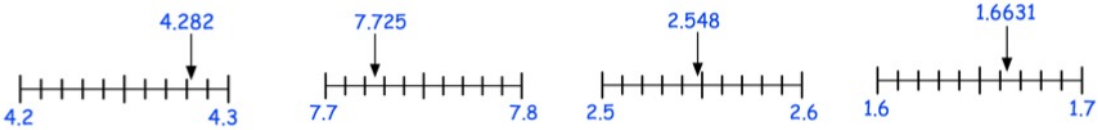
Question 2: Round each of the following numbers to 1 decimal place.

(a) 4.82 (b) 6.19 (c) 9.77 (d) 10.63 (e) 21.41 (f) 3.14 (g) 48.18

(h) 29.26 (i) 80.85 (j) 0.43 (k) 248.38 (l) 637.51 (k) 62.89 (l) 9.99

Question 3: Round each of the numbers below to one decimal place.

(a) 4.282 (b) 7.725 (c) 2.548 (d) 1.6631



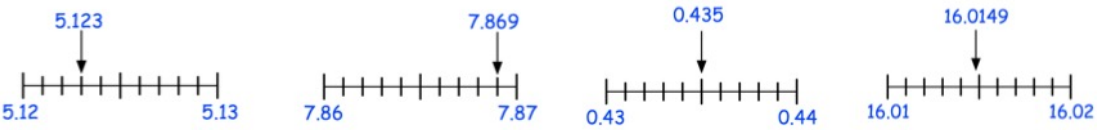
Question 4: Round each of the numbers below to the nearest tenth (1 decimal place)

(a) 5.191 (b) 8.246 (c) 10.087 (d) 39.555 (e) 0.831

(f) 93.2941 (g) 38.3152 (h) 7.26229 (i) 0.54868696

Question 5: Round each of the numbers below to 2 decimal places.

(a) 5.123 (b) 7.869 (c) 0.435 (d) 16.0149



Question 6: Round each of the numbers below to 2 decimal places

(a) 3.487 (b) 2.613 (c) 1.984 (d) 10.046 (e) 8.155

(f) 19.367 (g) 3.141 (h) 6.0698 (i) 4.26317 (j) 93.46197

Question 7: Round each of the numbers below to 3 decimal places

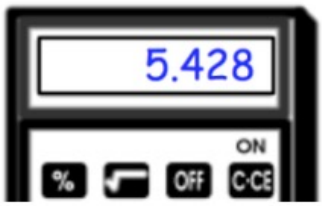
(a) 0.0346 (b) 6.7568 (c) 4.2251 (d) 1.7583

(e) 40.48546 (f) 128.01891 (g) 0.5059802 (h) 384.456094

Extension

Question 1: 51.26% of the people living in a town are female.
Round this figure to one decimal place.

Question 2: Walter has worked out a calculation on a calculator
Shown on the calculator is the answer.



(a) Round the answer to one decimal place
(b) Round the answer to two decimal places

Question 3: Daniel has been asked to round 1.725 to one decimal place.
His answer is 172.5
Explain Daniel's mistake.

Question 4: Nicole has rounded a number to one decimal place.
Her answer is 9.2
Write down 10 different possible numbers that she could have rounded.

Question 5: A chocolate bar contains 0.4715g of salt.
Round this to two decimal places.

Question 6: Dominic writes down two numbers, A and B.
A and B have 2 decimal places.
Dominic rounds A to 1 decimal place and calls his answer C.
He rounds B to 1 decimal place and calls his answer D.
Dominic says the difference between A and B cannot be the same as the difference between C and D.
Show he is incorrect

Fluency Practice

learn by heart

Sometimes we do not want to write all the digits of a decimal down and we can shorten it by rounding.

A number with 1 decimal place has 1 digit after the decimal point, e.g. 3.4

If rounding, to say, 2 decimal places, the value of the digit in the 3rd decimal place tells us whether to round up or down. If the 3rd decimal place is 5 or more, we round UP, which means we increase the value of the last digit by 1.

examples

Round:

a) 4.327 to 1 decimal place	4.3|27	4.3
b) 17.0269 to 2 decimal places	17.02|69	17.03
c) 3.7997 to 3 decimal places	3.799|7	3.800
d) 1.996 to the nearest 0.1	1.9|96	2.0

This means 1 decimal place

exercise 1j

1. Which of these numbers have 1 decimal place? Select all that apply.

   a) 43 b) 4.5 c) 2.75 d) 62.0 e) 200.30

2. Round each number to 1 decimal place:

   a) 3.62 c) 2.45 e) 4.319 g) 105.1098

   b) 1.84 d) 13.19 f) 26.453 h) 459.821

3. Round each number to 2 decimal places:

   a) 4.085 b) 23.1279 c) 604.30567

4. Round each number to 3 decimal places:

   a) 4.0858 b) 23.127 c) 604.30567

5. Find all the numbers that round to **3.5** to 1 decimal place:

A 3.48	D 3.41	G 3.45	J 3.34	M 3.41
B 3.51	E 3.62	H 3.55	K 3.56	N 3.509
C 3.63	F 3.81	I 3.67	L 3.39	O 3.409

Fluency Practice

6. Complete the table by rounding each number as shown:

	Number	to 1 d.p.	to 2 d.p.	Nearest Integer
a)	3.7281			
b)	52.5917			
c)	0.1853			
d)	9.6458			
e)	4.0028			

7. Which of these numbers is 24.976 correctly rounded to one decimal place?

a) 24.9 b) 24.10 c) 25 d) 24.98 e) 25.0

8. Which of these lengths is 32.77m given correct to the nearest 0.1m?

a) 33m b) 32.7m c) 32.70m d) 32.8m e) 32.80m

9. Show how these cards can be arranged to make a number that rounds to 27.5 to one decimal place.

10. Which of these numbers, when rounded to 2 decimal places, give 17.48 ? Choose all that apply.

a) 17.485 b) 17.475 c) 17.4805 d) 17.4705

11. Round:

a) 132.8427 to the nearest tenth

b) 4.7396 to the nearest hundredth

challenge (rounding recurring decimals)

12. Round each of these recurring decimals as indicated:

a) $0.\dot{6}$ (1 d.p.) d) $0.\dot{7}0\dot{5}$ (3 d.p.) g) $0.4\dot{8}$ (3 d.p.)

b) $0.\dot{3}\dot{4}$ (1 d.p.) e) $0.70\dot{5}$ (3 d.p.) h) $0.\dot{4}\dot{9}$ (3 d.p.)

c) $0.5\dot{7}$ (2 d.p.) f) 0.705 (3 d.p.) i) $0.\dot{9}$ (1 d.p.)

Rounding Numbers Code Breaker!

Round each of these numbers to the number of decimal places given.
The answer will then give you a letter in the code box.
Write it in the yellow box. The letters spell a secret message – can you crack it?

a. 0.34 to 1 d.p = 0.3 K

b. 0.483 to 1 d.p = ……..

c. 0.51 to 1 d.p = ……..

d. 1.05 to 1 d.p = ……..

e. 0.94 to 1 d.p = ……..

f. 1.22 to 1 d.p = ……..

g. 0.784 to 1 d.p =……..

h. 0.784 to 2 d.p =……..

i. 0.809 to 1 d.p =……..

j. 0.789 to 2 d.p =……..

k. 0.749 to 1 d.p =……..

l. 1.234 to 2 d.p =……..

m. 0.781 to 2 d.p = ……..

n. 0.779 to 2 d.p = ……..

o. 0.911 to 2 d.p =……..

p. 1.225 to 2 d.p =……..

q. 1.27 to 1 d.p = ……..

r. 0.777 to 2 d.p =……..

CODE BOX

0.3 = K	0.4 = X	0.75 = B	1 = J
1.22 = U	0.51 = H	0.74 = C	1.31 = K
0.69 = Q	1.01 = Z	1.21 = F	0.81 = R
1.3 = Y	1.1 = P	0.5 = E	1.24 = T
0.91 = D	1.2 = M	1.23 = A	0.65 =U
0.9 = S	0.8 = I	0.78 = L	0.71 = V
0.6 = O	0.79 = N	0.7 = G	0.48 = ?

s. 0.58 to 1 d.p =……..

t. 0.792 to 2 d.p ……..

u. 0.699 to 1 d.p ……..

Fluency Practice

Instructions: Complete the remaining boxes by making the minimum change possible to the centre box. If there are boxes that cannot be filled in, say why.

Rounded to 1 decimal place

Number of digits

	Less	Same	More
More			
Same		4.7235	
Less			

For each question, is the 0 underlined in red needed?

1 0.2050	2 0.2050	3 0.2050	4 50
5 5.0	6 5.02	7 502	8 400
9 400	10 5.020	11 064	12 9005.10

Fluency Practice

1 For each number given, tick the significant digits and cross the non-significant digits:

	1,000	100	10	1	●	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$	$\frac{1}{1,000,000}$
a)	9	2	3	4							
✓ or ×											
b)	9	2	3	0							
✓ or ×											
c)	9	2	0	0							
✓ or ×											
d)	9	2	0	4							
✓ or ×											
e)	9	0	3	4							
✓ or ×											
f)	9	0	0	0							
✓ or ×											
g)		9	0	0							
✓ or ×											
h)			9	0							
✓ or ×											
i)				9							
✓ or ×											
j)				0	●	9					
✓ or ×											
k)				0	●	9	0				
✓ or ×											
j)				0	●	0	9				
✓ or ×											

	1,000	100	10	1	●	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$	$\frac{1}{1,000,000}$
k)				0	●	0	0	9			
✓ or ×											
l)				0	●	0	0	9	2	3	4
✓ or ×											
m)				0	●	9	2	3	4		
✓ or ×											
n)				0	●	9	2	0	4		
✓ or ×											
o)				0	●	9	0	3	4		
✓ or ×											
p)				0	●	9	2	0	0		
✓ or ×											
q)				0	●	9	2	3	0		
✓ or ×											
r)				0	●	9	2	3	0	0	
✓ or ×											
s)				0	●	9	2	3	0	0	0
✓ or ×											
t)			1	0	●	9	2	3	0	0	0
✓ or ×											
u)			1	0	●	9	2	3			
✓ or ×											

2 State how many significant figures each of the following numbers have:

	1,000	100	10	1	●	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$	$\frac{1}{10,000}$	Number of Significant figures
a)	8	0	0	0						
b)	8	8	0	0						
c)		8	8	0						
d)		8	0	8						
e)	8	0	8	0						
f)	8	0	8	8						
g)				0	●	8				
h)				0	●	0	8			
i)				0	●	0	8	8		
j)				0	●	8	0	8		
k)				0	●	0	8	0	8	
l)				0	●	0	0	0	8	
m)				0	●	8	0	0	8	
n)			8	0	●	0	0	0	0	
o)			8	0	●	0	0			
p)		8	0	0	●	0				
q)	8	0	0	0	●	0				

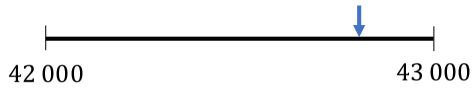
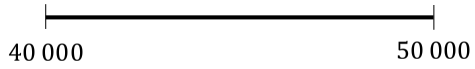
Fluency Practice

Number	Rounded to 1 significant figure	Rounded to 2 significant figures	Rounded to 3 significant figures
1254			
59287			
699721			
0.3451			
0.005231			
0.050554			
0.050999			

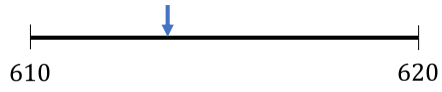
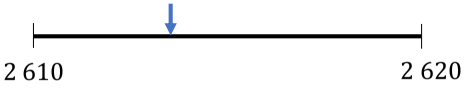
Extension

A number is rounded to 1sf to 1000. How many possible integers could the original number have been?

Fill in the Gaps

Original Number	Round to ___ significant figure	Place value of that significant figure	Original Number on Number line	Round up or down?	Answer
42 850	2	1 000		Up	43 000
42 850	1	10 000			
42 850	3	100			
40 850	3				
40 950	3				
40 950	2				
563 814		1 000			
563 814		100 000			

Fill in the Gaps

Original Number	Round to ___ significant figure	Place value of that significant figure	Original Number on Number line	Round up or down?	Answer
614					
2 614					
3 649					3 600
3 999					4 000
				Up	28 000
				Down	28 000
					1 700

For which questions could you have more than one answer? For each of these explain the types of answers allowed and not allowed.

Fluency Practice

3 For each number given, round to the number of significant figures given:

(a) 76 (1 s.f.) ≈ _____

(b) 320 (1 s.f.) ≈ _____

(c) 475 (1 s.f.) ≈ _____

(d) 5,500 (1 s.f.) ≈ _____

(e) 8,272 (1 s.f.) ≈ _____

(f) 5,499 (1 s.f.) ≈ _____

(g) 32,654 (1 s.f.) ≈ _____

(h) 19,500 (1 s.f.) ≈ _____

(i) 825 (2 s.f.) ≈ _____

(j) 261 (2 s.f.) ≈ _____

(k) 5,841 (2 s.f.) ≈ _____

(l) 8,054 (2 s.f.) ≈ _____

(m) 2,374 (2 s.f.) ≈ _____

(n) 34,821 (2 s.f.) ≈ _____

(o) 7,654 (3 s.f.) ≈ _____

(p) 5,448 (3 s.f.) ≈ _____

(q) 125,640 (3 s.f.) ≈ _____

(r) 35,253 (4 s.f.) ≈ _____

4 For each number given, round to the number of significant figures given:

(a) 2.9 (1 s.f.) ≈ _____

(b) 1.4 (1 s.f.) ≈ _____

(c) 18.1 (1 s.f.) ≈ _____

(d) 73.6 (1 s.f.) ≈ _____

(e) 29.3 (1 s.f.) ≈ _____

(f) 2.3609 (1 s.f.) ≈ _____

(m) 41.095 (1 s.f.) ≈ _____

(n) 578.2194 (1 s.f.) ≈ _____

(o) 1254.33 (3 s.f.) ≈ _____

5 For each number given, round to the number of significant figures given:

(a) 4.31 (2 s.f.) ≈ _____

(b) 42.84 (3 s.f.) ≈ _____

(c) 2.3609 (3 s.f.) ≈ _____

(d) 7.3482 (4 s.f.) ≈ _____

(m) 1254.33 (5 s.f.) ≈ _____

(n) 41.095 (6 s.f.) ≈ _____

Fluency Practice

6 For each number given, round to the number of significant figures given:

(a) 0.054 (1 s.f.) ≈ _____

(b) 0.161 (1 s.f.) ≈ _____

(c) 0.048 (1 s.f.) ≈ _____

(d) 0.8835 (1 s.f.) ≈ _____

(e) 0.00064 (1 s.f.) ≈ _____

(f) 0.3189 (2 s.f.) ≈ _____

(g) 0.5622 (2 s.f.) ≈ _____

(h) 0.04912 (2 s.f.) ≈ _____

(i) 0.06014 (2 s.f.) ≈ _____

(j) 0.0157 (2 s.f.) ≈ _____

(k) 0.90341 (3 s.f.) ≈ _____

(l) 0.08906 (3 s.f.) ≈ _____

(m) 0.007812 (3 s.f.) ≈ _____

(n) 0.6006 (3 s.f.) ≈ _____

(o) 0.050999 (5 s.f.) ≈ _____

7 For each number given, round to the number of significant figures given:

(a) 97 (1 s.f.) ≈ _____

(b) 99 (1 s.f.) ≈ _____

(c) 9,964 (1 s.f.) ≈ _____

(d) 9,964 (2 s.f.) ≈ _____

(e) 699,721 (2 s.f.) ≈ _____

(f) 699,721 (3 s.f.) ≈ _____

(g) 9.7299 (1 s.f.) ≈ _____

(h) 9.9566 (1 s.f.) ≈ _____

(i) 41.095 (4 s.f.) ≈ _____

(j) 9.7299 (4 s.f.) ≈ _____

(k) 0.096 (1 s.f.) ≈ _____

(l) 0.050999 (3 s.f.) ≈ _____

(m) 9.9566 (2 s.f.) ≈ _____

(n) 9.7299 (4 s.f.) ≈ _____

(o) 0.50999 (4 s.f.) ≈ _____

Fluency Practice

Round to the nearest 10

(a)	156	(b)	671
(c)	5614	(d)	3277
(e)	7499	(f)	56123
(g)	131789	(h)	86
(i)	33.5	(j)	3.2

Round to the nearest 100

(a)	156	(b)	671
(c)	5614	(d)	3277
(e)	7499	(f)	56123
(g)	131789	(h)	86
(i)	233.5	(j)	43.2

Round to the nearest 1000

(a)	5614	(b)	3277
(c)	7499	(d)	56123
(e)	131789	(f)	866

Round to 1 significant figure

(a)	156	(b)	7614
(c)	3277	(d)	56123
(e)	131789	(f)	86.2
(g)	33.5	(h)	3.29
(i)	0.145	(j)	0.06378

Round to 2 significant figures

(a)	156	(b)	7614
(c)	3277	(d)	56123
(e)	131789	(f)	86.2
(g)	33.5	(h)	3.29
(i)	0.145	(j)	0.06378

Fluency Practice

Question 1: Round each of the following numbers to 1 significant figure

(a) 36 (b) 22 (c) 83 (d) 68 (e) 97 (f) 120 (g) 519

(h) 260 (i) 741 (j) 888 (k) 408 (l) 650 (m) 148 (n) 972

(o) 3900 (p) 5400 (q) 4125 (r) 2732 (s) 6349 (t) 8099 (u) 6499

Question 2: Round each of the following numbers to 1 significant figure

(a) 12000 (b) 46000 (c) 74500 (d) 83771 (e) 95120 (f) 330000

(g) 863000 (h) 248220 (i) 489331 (j) 13800000

Question 3: Round each of the following numbers to 1 significant figure

(a) 2.9 (b) 3.2 (c) 5.7 (d) 46.81 (e) 57.25 (f) 80.96 (g) 94.9

(h) 115.1 (i) 8.482 (j) 13.65 (k) 66.321 (l) 5501.4 (m) 48.02 (n) 99.99

Question 4: Round each of the following numbers to 1 significant figure

(a) 0.54 (b) 0.86 (c) 0.161 (d) 0.048 (e) 0.0943 (f) 0.0071 (g) 0.0038

(h) 0.06482 (i) 0.8835 (j) 0.00064 (k) 0.00098 (l) 0.00002789

Question 5: Round each of the following numbers to 2 significant figures

(a) 844 (b) 665 (c) 129 (d) 2840 (e) 9250 (f) 1359 (g) 298

(h) 504 (i) 999 (j) 3841 (k) 48500 (l) 13.7 (m) 58.3 (n) 49.6

(o) 1.41 (p) 42.64 (q) 0.3189 (r) 22490 (s) 186110 (t) 0.04912 (u) 4.98

(v) 997826 (w) 2.99517 (x) 0.06014

Question 6: Round each of the following numbers to 3 significant figures

(a) 9433 (b) 1891 (c) 2496 (d) 3.226 (e) 37756 (f) 57147 (g) 7.0078

(h) 51.564 (i) 0.90341 (j) 2.7892 (k) 0.08906 (l) 0.007812 (m) 9909.1 (n) 0.6006

Extension

Question 1: In an election 43.8% of people voted for a candidate.
Round this figure to one significant figure

Question 2: 32641 people watch a rugby match between Italy and Argentina.
Round this number to 2 significant figures.

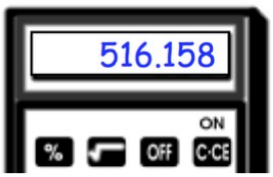
Question 3: Round the following numbers to 1 significant figure

(a) eight million, six hundred thousand

(b) the product of 19 and 351

Question 4: Tom has been asked to round the number on the calculator to 2 significant figures.
Tom says the answer is 516.16

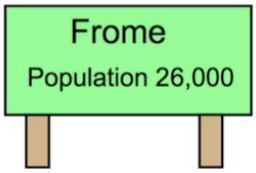
Can you explain Tom's mistake?



Question 5: The population of Frome to 2 significant figures is 26,000.

(a) Write down the lowest number of people that could live in Frome?

(b) Write down the greatest number of people that could live in Frome?

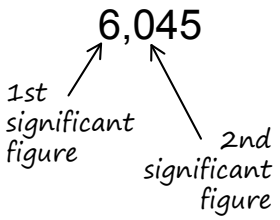


Question 6: Round 7.494×10^7 to 2 significant figures.
Give your answer as an ordinary number.

Rounding to Significant Figures			
(a)	**(b)**	**(c)**	**(d)**
Round 763 to 1 significant figure	Round 4382 to 1 significant figure	Round 92865 to 2 significant figures	Round 725 to 2 significant figures
(e)	**(f)**	**(g)**	**(h)**
Round 0.0643 to 1 significant figure	Round 756482 to 3 significant figures	Round 0.7634 to 2 significant figures	Round 8.2754 to 2 significant figures
(i)	**(j)**	**(k)**	**(l)**
Round 0.08537 to 2 significant figures	Round 9.524 to 1 significant figure	Round 243.725 to 4 significant figures	Round 89.43 to 1 significant figure
(m)	**(n)**	**(o)**	**(p)**
Round 0.982 to 1 significant figure	Round 9.428553 to 5 significant figures	Round 1875.4 to 3 significant figures	Round 1856702 to 3 significant figures
(q)	**(r)**	**(s)**	**(t)**
Round 0.00456289 to 5 significant figures	Find two numbers that round to both 80 to 1 significant figure and 84 to 2 significant figures	Find two numbers that round to both 44.7 to 1 decimal place and 45 to 2 significant figures	Find two numbers that round to both 0.7 to 1 significant figure and 0.70 to 2 significant figures

Fluency Practice

learn by heart



The **first significant figure** of a number is the first non-zero digit

'Trapped zeros' lie between 2 other digits. They are significant.

examples

Round 348 to 1 significant figure (1.s.f)

(1st significant figure is in the hundreds column, so round to the nearest hundred)

= 300

Round 4,075 to 2 significant figures (2.s.f)

(2nd significant figure is in the hundreds column, so round to the nearest hundred)

= 4,100

exercise 1j

1. Round each of these numbers to 1 significant figure:

   a) 53 c) 709 e) 2,409

   b) 56 d) 358 f) 15,008

2. Round each of these numbers to 2 significant figures:

   a) 956 c) 15,809 e) 194,037

   b) 2,085 d) 12,314 f) 280,300

3. The number 6,008 has ____ significant figures.

4. The number 84,001 has ____ significant figures.

5. Round each of these numbers as indicated:

   a) 536 (2 s.f.) d) 8,900 (1 s.f.) g) 99 (1 s.f.)

   b) 804 (2 s.f.) e) 84 (2 s.f.) h) 999 (2 s.f.)

   c) 12,400 (2 s.f.) f) 12 (1 s.f.) i) 9,999 (3 s.f.)

6. Find all the numbers that round to 100, to 1 significant figure:

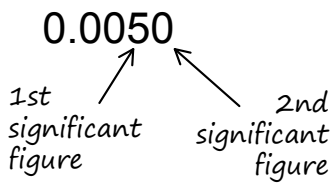
A 105	D 102	G 99	J 95	M 90	P 110
B 92	E 100	H 130	K 107	N 91	Q 96
C 98	F 90	I 170	L 89	O 55	R 140

Fluency Practice

learn by heart

The zeros at the start of a decimal are **not significant**

The zeros at the end of a decimal **ARE** significant



examples

Round 0.0489 to 1 significant figure (1.s.f)	Round 0.0899 to 2 significant figures (2.s.f)
(1st significant figure is in the hundredths column, so round to the nearest tenth)	(2nd significant figure is in the thousandths column, so round to the nearest thousandth)
= 0.05	= 0.090

exercise 1k

1. Which of these numbers has 3 significant figures?

   a) 2.486 b) 2.406 c) 3.490 d) 0.0300

2. Round each of these to 1 significant figure:

   a) 0.765 c) 0.038 e) 2.845

   b) 0.408 d) 0.0193 f) 0.099

3. Round each of these to 2 significant figures:

   a) 3.867 c) 0.247 e) 0.309

   b) 0.608 d) 12.859 f) 0.0049

4. The number 0.307 has ____ significant figures.

5. The number 4.8050 has ____ significant figures.

6. The number 900.009 has ____ significant figures.

7. Round each of these as indicated:

   a) 0.289 (2 s.f.) d) 8.207 (3 s.f.) g) 0.3007 (3 s.f.)

   b) 42.806 (3 s.f.) e) 0.069 (2 s.f.) h) 0.0914 (2 s.f.)

   c) 0.0987 (2 s.f.) f) 4.98 (1 s.f.) i) 8.999 (2 s.f.)

8. What is the value of $0.\dot{4}0\dot{8}$ to 4 significant figures?

Fluency Practice

exercise 1l

1. Circle the first significant figure in each of these numbers.

   a) 0.429 b) 9002 c) 45

   d) 0.00011 e) 0.704 f) 32,415

2. How many significant figures do each of these numbers have?

   a) 506 b) 0.03 c) 0.4500 d) 23.605

3. Which of these has 2 significant figures? Circle all that apply.

   a) 0.08 b) 108 c) 0.080 d) 1.08

4. Round each of these numbers to one significant figure:

   a) 6.928 b) 0.00438 c) 82.9

   d) 417.809 e) 0.089 f) 0.92

5. Which of these numbers is 72.46 rounded to one significant figure?

   a) 72 b) 72.5 c) 70 d) 7

6. Which of these numbers have the digit **3** as the second significant figure? Choose all that apply.

   a) 4.312 b) 3.2 c) 403.1 d) 0.329 e) 0.0731

7. Round each of these numbers to the number of significant figures shown:

   a) 45 (1 s.f.) e) 0.0507 (2 s.f.) i) 9607 (2 s.f.)

   b) 0.956 (2 s.f.) f) 503 (1 s.f.) j) 8.099 (3 s.f.)

   c) 3005 (3 s.f.) g) 900 (2.s.f) k) 609 (2 s.f.)

   d) 551.8 (2 s.f.) h) 0.56 (1 s.f.) l) 800 (3 s.f)

8. Could the most significant figure in a number be a zero?

9. Could the second most significant figure in a number be a zero?

10. True or false: 42.389 rounded to 3 s.f. > 42.389 rounded to 3 d.p. ?

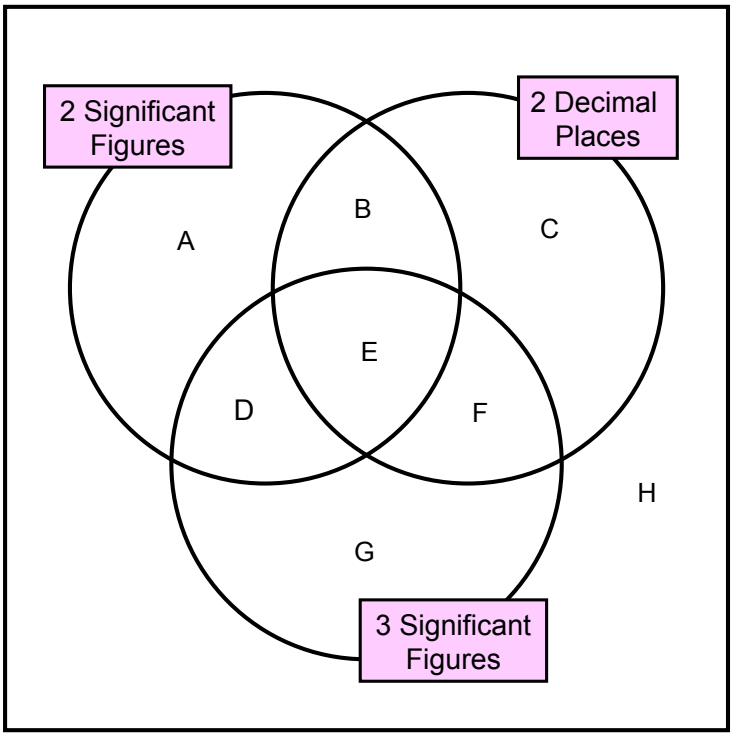
Fluency Practice

11. Which section of the diagram should each of the following numbers be in?

    Some of the numbers go outside of the circles.

31.5	0.340	3001
43	2.3	0.25
396.41	403	0.9
0.90	3.52	1.01

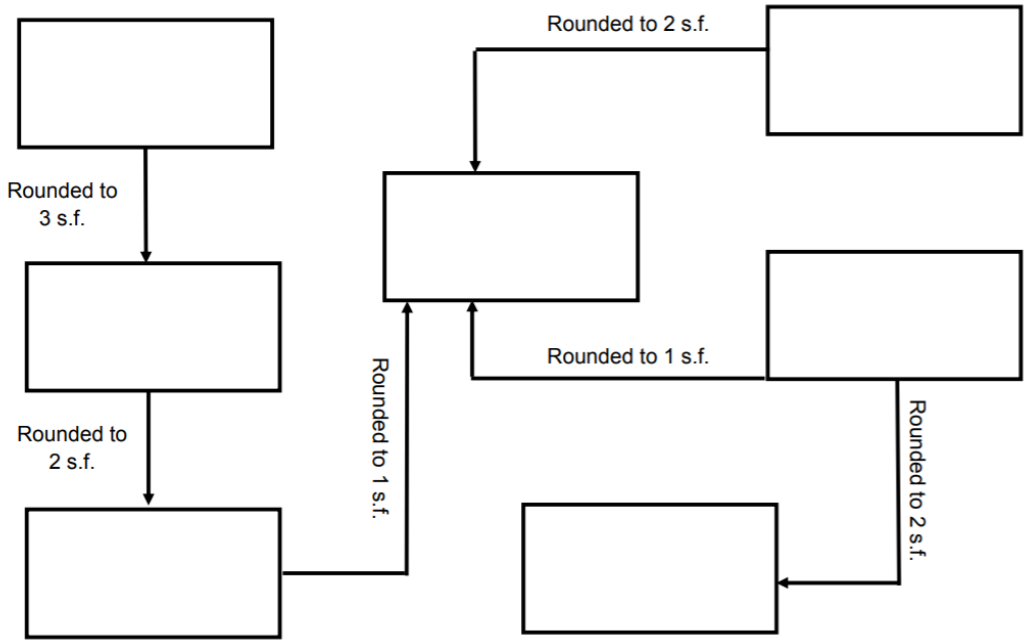
extension: there are two empty sections, can you think of a number that would go in each of these two sections?



Round It! extra challenge

Place the numbers in the boxes so that all arrows indicate a correct rounding

3160	3200	3000	3164
2900	3049	2919	

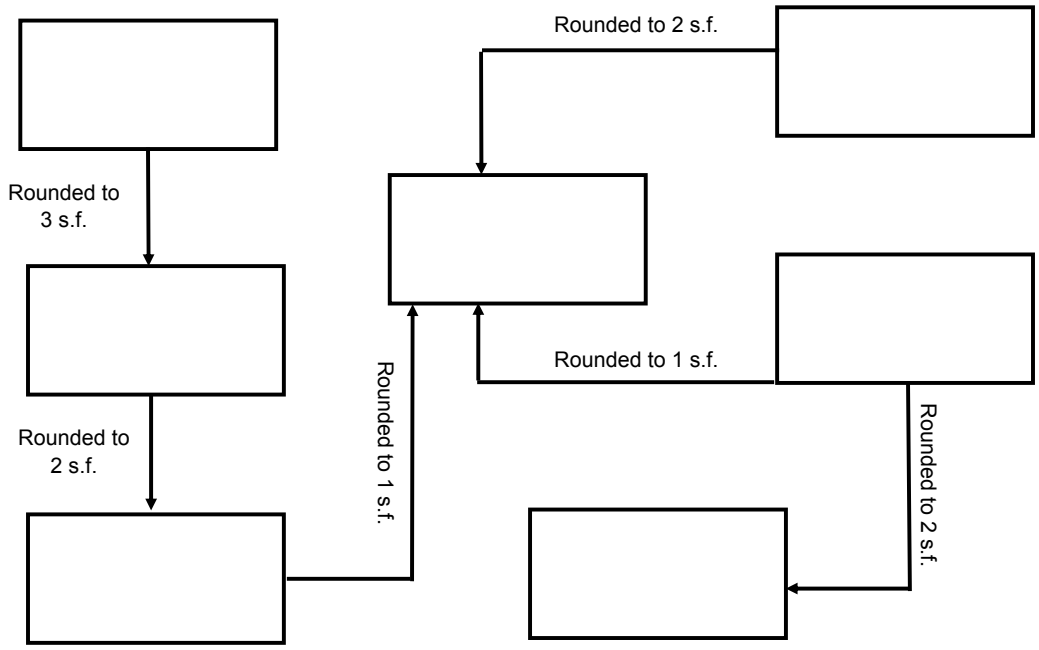


Problem Solving

round it!

Place the numbers in the boxes so that all the arrows indicate a correct rounding.

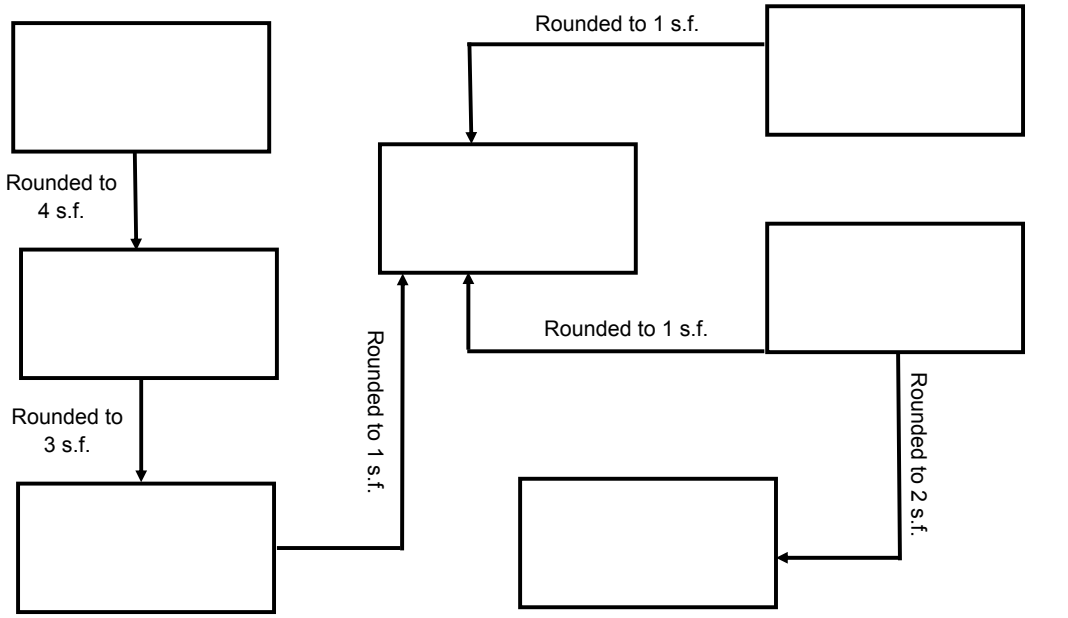
3160 | 3200 | 3000 | 3164 | 2900 | 3049 | 2919



round it (2)!

Place the numbers in the boxes so that all the arrows indicate a correct rounding.

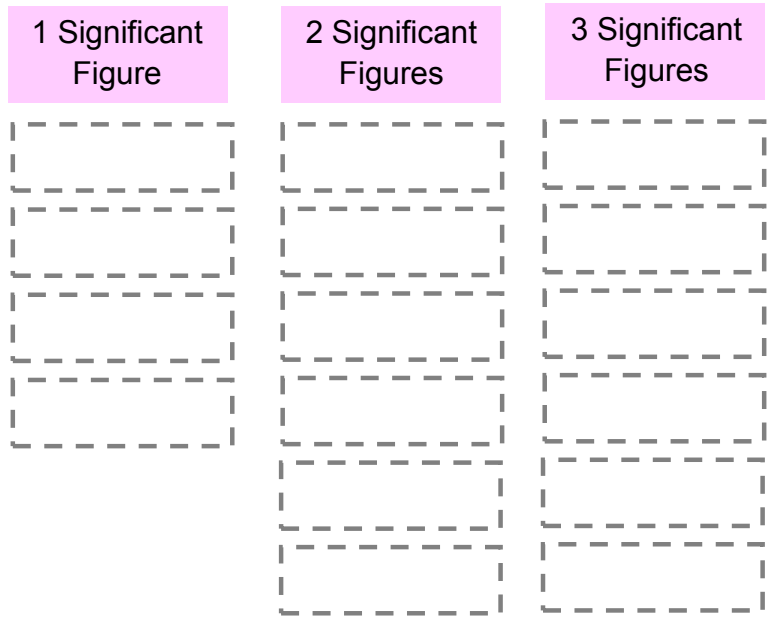
31 | 31.1 | 29.4 | 31.049 | 30 | 31.05 | 29



Fluency Practice

A. Sort these numbers into the correct column on the right.

2.2 0.034 0.109 6030 0.00391 0.001 432000 5.07 4000 310 30 0.010 45 50100 34000 800



B. Multiple Choice
Choose the correct answer for each of these questions:

1. Round 0.345 to 2 significant figures
a) 0.3
b) 0.4
c) 0.34
d) 0.35

2. Round 3409 to 3 significant figures
a) 341
b) 3400
c) 3410
d) 3409

3. Round 4.005 to 2 significant figures
a) 4.0
b) 4.005
c) 4.01
d) 4.015

4. Round 30.659 to 3 significant figures
a) 30.6
b) 30.7
c) 31
d) 30.66

5. Round 0.0999 to 3 significant figures
a) 0.0999
b) 0.09
c) 0.1000
d) 0.100

6. 4099.2 to 3 significant figures
a) 4010
b) 4100
c) 410
d) 4000

C. Round each of these to the number of significant figures shown:

a) 5676 (1 s.f.) ……
b) 2039 (2 s.f.) ……
c) 54.989 (3 s.f.) ……
d) 500798 (3 s.f.) ……
e) 0.00088 (1 s.f.) ……
f) 420.903 (4 s.f.) ……
g) -0.899 (2 s.f.) ……
h) 109.99 (3 s.f.) ……

There are 8 true statements hidden in this grid. Can you find them?

54.43 to 1 s.f. is 54.4	1492 to 3 s.f. is 149	0.81 to 2 s.f. is 0.81	0.995 to 2 s.f. is 0.99	0.0999 to 2 s.f. is 0.100
2.004 to 1 s.f. is 2.0	3997 to 2 s.f. is 4000	492 to 1 s.f. is 490	0.0005 to 2 s.f is 0.0	0.0999 to 2 s.f. is 0.010
4.106 to 2 s.f. is 4.1	4.03 to 2 s.f. is 4	0.0384 to 2 s.f. is 0.038	4.893 to 3 s.f. is 4.90	0.0999 to 2 s.f. is 0.10
19.9 to 2 s.f. is 20	1.0090 to 3 s.f. is 1.01	9004 to 2 s.f. is 9004	0.0034 to 1 s.f. is 0.003	4.0834 to 3 s.f. is 4.083

There are 8 true statements hidden in this grid. Can you find them?

581 to 1 s.f. is 580	3694 to 3 s.f. is 369	3.0381 to 3 s.f. is 3.04	6.0041 to 2 s.f. is 6.004	0.135 to 2 s.f is 0.14
5986 to 2 s.f. is 6000	0.0998 to 2 s.f. is 0.010	0.875 to 2 s.f. is 0.87	63.85 to 1 s.f. is 63.9	299.9 to 2 s.f. is 300
3.012 to 1 s.f. is 3.0	0.0998 to 2 s.f. is 0.100	51.02 to 3 s.f. is 51	0.92 to 2 s.f. is 0.92	501.14 to 3 s.f. is 501.1
7038 to 2 s.f. is 7040	0.0998 to 2 s.f. is 0.10	7.256 to 2 s.f. is 7.3	0.135 to 2 s.f is 0.1	0.0597 to 2 s.f. is 0.060

Fluency Practice

Number	1dp	2dp	1sf	2sf	3sf
123.456					
144.402					
8888.888					
437.3946					
987.654					
3 809 830.492					
1.98043					
4.80808					
99.009900					

Rounding Whole Numbers

Write each number to the nearest...

MEGA TABLE	5	10	20	50	100	500	1 000	5 000	10 000
786									
1 265									
3 954									
14 527									
25 463									

Fluency Practice

ROUNDING

	63.24483	5.009434	68493.549	0.920472	7.085686	0.049243	17.95	4.9956	9.99899
1 sf									
1 dp									
2 sf									
2 dp									
3 sf									
3 dp									

Activity

Round to the nearest whole number	Round to 3 significant figures	Round to 1 decimal place
Round to 1 significant figure	**Number**	Round to 2 decimal places
Round to nearest 100	Round to 2 significant figures	Round to nearest 10

You have 6 cards with digits on them and a card with a decimal point.

0	0	0	4	5	6	.

Arrange the cards with no trailing zeros to have the following:

Two of the answers have the same solution, can you predict which ones they will be before you start the task?

The largest number with 3 significant figures

The number closest to 1

The number closest to $\frac{5}{100}$

The number closest to a square number

The largest number with four significant figures

The smallest number with five significant figures

The number closest to 0.005

The highest number that rounds to 0.4

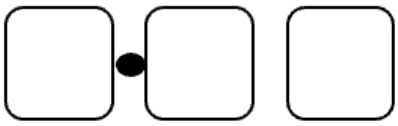
The number closest to $\frac{4}{10}$

The number closest to 0.004

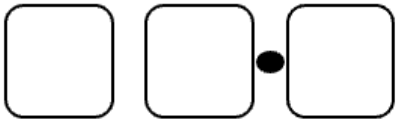
The number closest to an integer

Extension

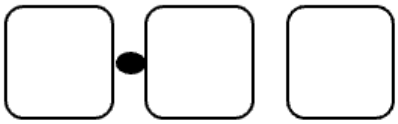
1, 1, 2, 3, 4, 5, 5, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7, 7, 7, 7, 8, 8, 9, 9, 9



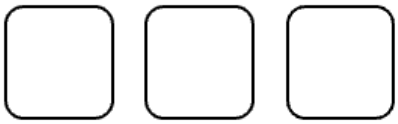
4.6
(1dp)



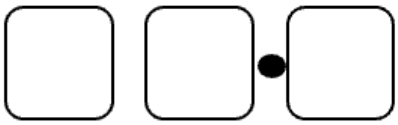
75
(Whole)



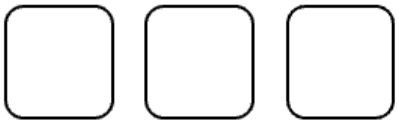
5.8
(1dp)



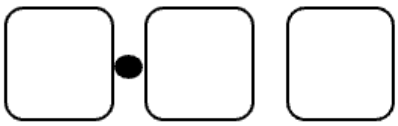
700
(hundred)



88
(whole)

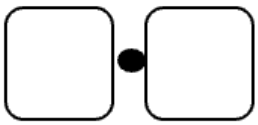


370
(nearest 10)



2.2
(1dp)

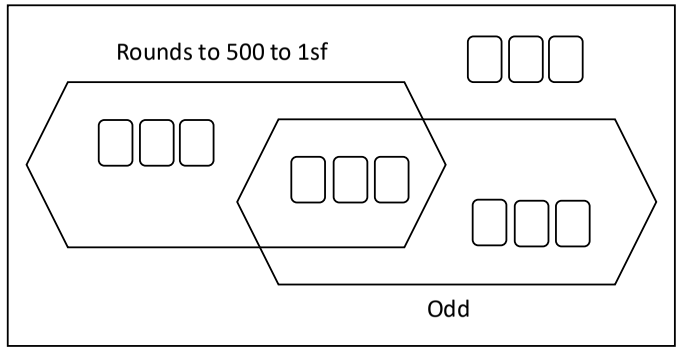
30
(nearest 10)



8
(nearest whole)

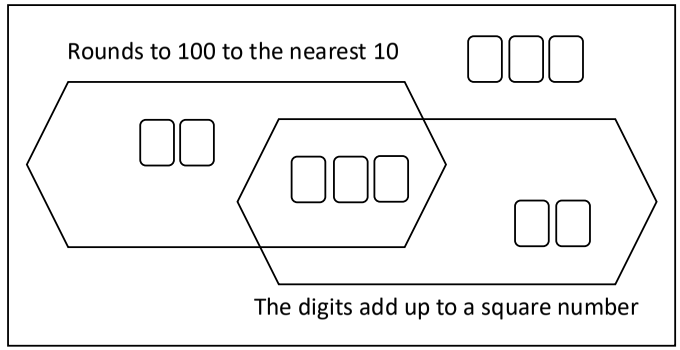
Using only the digits at the side **once in each section**, complete the Venn diagram

5
4
6



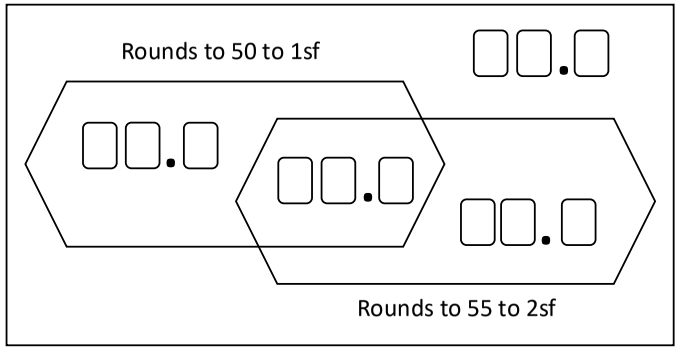
Using only the digits at the side **once in the entire diagram**, complete the Venn diagram

1 2
3 4
5 6
7 8
9 0



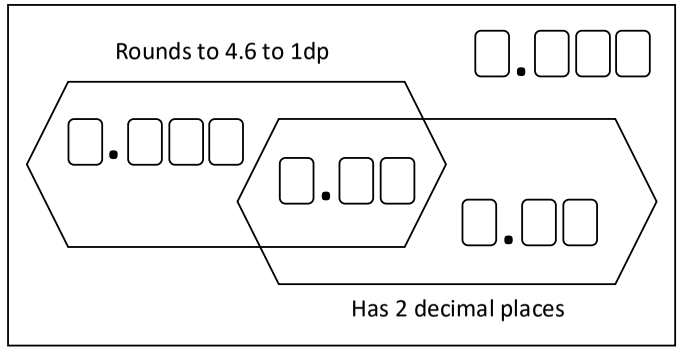
Using only the digits at the side **once in the entire diagram**, complete the Venn diagram

5 5
5 5
5 5
4 4
4 4
4 4



Using only the digits at the side **once in each section**, complete the Venn diagram

0
4
5
6



Andrea chooses two numbers from the list.

44.37	44.44	44.48	44.53
44.55	44.63	44.67	44.71

When she rounds the two numbers to 1 decimal place they are equal.

When she rounds the two numbers to 2 significant figures, they are not equal.

Find Andrea's numbers.

Find a number that works for each question.

a. When rounded to the nearest ten and to the nearest hundred, the answer is the same.

b. When rounded to one decimal place and one significant figure, the answer is the same.

c. When rounded to two significant figures and the nearest hundred, the answer is the same.

d. When rounded to the nearest five and the nearest odd number, the answer is the same.

e. When rounded to three significant figures and two decimal places, the answer is the same.

To one significant figure, my number is 10,000

My number has 7 hundreds

My number has 9 units

My number has 8 tenths

One of the spaces above is for a decimal point.

There are two sevens in my number

To the nearest thousand, my number is 15,000

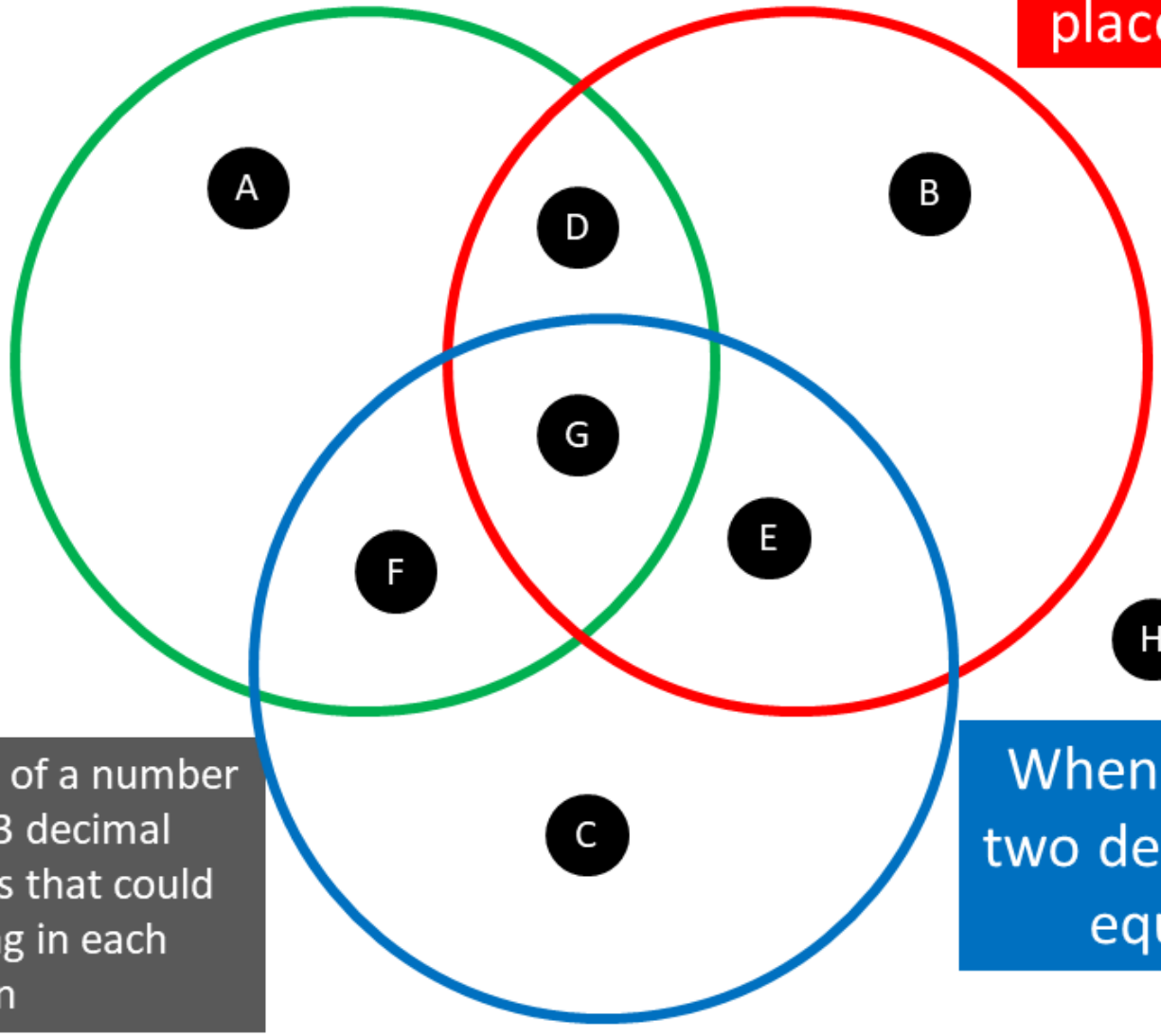
There are two digits after the decimal point

The 5th and 7th digits are the same

Maths Venns

When rounded to the nearest integer, equals 1

When rounded to one decimal place, equals 0.5



If you think a region is impossible to fill, convince me why!

Think of a number with 3 decimal places that could belong in each region

When rounded to two decimal places, equals 0.50

Maths Venns

Rounds to 0.067 to 2sf
If you think a region is impossible to fill, convince me why!
Rounds to 0.1 to 1dp
Rounds to 0.06 to 1sf
Think of a number that could belong in each of the regions
A
B
C
D
E
F
G
H

2 Metric Units

Fluency Practice

Match each word to both description using the definitions in the table, and highlight any that aren't in common use.

Centigram	Ten metres
Millilitre	One thousandth of a metre
Kilogram	One thousandth of a gram
Milligram	One tenth of a litre
Decigram	Ten litres
Kilometre	One hundredth of a gram
Decagram	On hundredth of a litre
Decametre	One hundredth of a metre
Centimetre	One thousandth of a litre
Centilitre	One thousand grams
Kilolitre	One tenth of a gram
Decilitre	One tenth of a metre
Decalitre	Ten grams
Millimetre	One thousand litres
Decimetre	One thousand metres

Fill in the Gaps

Complete the missing lengths in this table:

mm	cm	m	km
50			
2000			
	350		
		26	
		600	
			0.75
			2.5

Match these lengths into equivalent pairs. Record your answers in the table at the bottom.

A 12cm	B 1.2m	C 21cm	D 120mm
E 210m	F 0.12km	G 2.1km	H 12m
I 2100mm	J 210cm	K 1200cm	L 21mm
M 2.1cm	N 0.21m	O 0.21km	P 2100m
Q 1.2km	R 120m	S 1200m	T 120cm

Fluency Practice

Question 1: Convert the following lengths into centimetres (cm)

(a) 4 m (b) 9 m (c) 12 m (d) 59 m

(e) 750 m (f) 105 m (g) 2.5 m (h) 8.2 m

(i) 1.53 m (j) 0.6 m (k) 0.38 m (l) 0.03 m

Question 2: Convert the following lengths into metres (m)

(a) 300 cm (b) 700 cm (c) 900 cm (d) 1400 cm

(e) 250 cm (f) 740 cm (g) 1000 cm (h) 348 cm

(i) 80 cm (j) 70 cm (k) 53 cm (l) 2 cm

Question 3: Convert the following lengths into centimetres (cm)

(a) 60 mm (b) 30 mm (c) 65 mm (d) 87 mm

(e) 280 mm (f) 812 mm (g) 2030 mm (h) 9000 mm

(i) 7 mm (j) 4 mm (k) 1.3 mm (l) 0.6 mm

Question 4: Convert the following lengths into millimetres (mm)

(a) 2 cm (b) 6 cm (c) 4.5 cm (d) 9.2 cm

(e) 13 cm (f) 78 cm (g) 124 cm (h) 520 cm

(i) 0.5 cm (j) 0.2 cm (k) 0.8 cm (l) 0.16 cm

Question 5: Convert the following lengths into metres (m)

(a) 4 km (b) 9 km (c) 13 km (d) 28 km

(e) 125 km (f) 300 km (g) 7000 km (h) 7200 km

(i) 0.5 km (j) 0.8 km (k) 1.2 km (l) 2.6 km

(m) 0.07 km (n) 0.02 km (o) 0.006 km (p) 1.008 km

Question 6: Convert the following lengths into kilometres (km)

(a) 6000 m (b) 2000 m (c) 5500 m (d) 6400 m

(e) 800 m (f) 600 m (g) 450 m (h) 125 m

(i) 70 m (j) 90 m (k) 35 m (l) 4 m

(m) 90000 m (n) 40000 m (o) 340000 m (p) 90530 m

Question 7: Convert the following lengths

(a) 2 m into mm (b) 8 m into mm (c) 6500 mm into m

(d) 9000 mm into m (e) 48000 cm into km (f) 9250000 cm into km

(g) 780 mm into m (h) 4km into cm (i) 1km into mm

(j) 25000000 mm into km (k) 0.5 km into cm (l) 0.023km into mm

Fluency Practice

learn by heart

When converting to a larger unit, divide

When converting to a smaller unit, multiply

examples

Convert 70cm into metres.

$70 \div 100$

$= 0.7m$

Convert 7m into kilometres.

$7 \div 1000$

$= 0.007km$

Convert 84cm into mm.

84×10

$= 840mm$

exercise 7g

1. Complete these statements:

a) 3000cm = _____m

b) _____mm = 36cm

c) _____cm = 0.72m

d) 108m = _____km

e) 1.25cm = _____mm

f) 0.7km = _____m

g) 80mm = _____cm

h) 2km = _____m

i) _____cm = 0.91m

j) _____km = 680m

2. Fill in the table to show equivalent lengths:

	mm	cm	m	km
A		600		
B			80	
C			1000	
D	2000			

3. Which of the following is equal to 200cm?

a) 2000mm b) 0.2km c) 20m d) 0.02km

4. Which of the following is the largest?

a) 500cm b) 7m c) 0.08km d) 9000mm

Fluency Practice

matching activity

5. Find 12 pairs of matching lengths. Record your results in the table.

A 4m	**B** 3.5m	**C** 250m	**M** 35cm	**N** 0.5km	**O** 0.015km
D 500m	**E** 1.5m	**F** 2500m	**P** 1.05km	**Q** 400cm	**R** 0.25km
G 0.4m	**H** 0.35m	**I** 15m	**S** 350cm	**T** 40cm	**U** 105cm
J 1.05m	**K** 1050m	**L** 350m	**V** 0.35km	**W** 2.5km	**X** 150cm

A	B	C	D	E	F	G	H	I	J	K	L

6. True or false?

a) 30m = 300cm b) 5.4m = 54cm c) 2.8cm = 280mm

7. Fill in the blank spaces.

a) 2cm + 3mm = _____cm

b) 5cm + 1mm = _____cm

c) 12cm + 8mm = _____cm

d) 6.1cm + 9mm = _____cm

e) 8cm + 10mm = _____cm

f) 1.1cm + 9mm = _____mm

8. Complete these conversions:

a) 0.24km = _____cm

b) 3,400mm = _____m

c) 1.9m = _____mm

d) 52,000cm = _____km

e) 0.01m = _____mm

f) 290mm = _____m

9. Which of the following is equal to 4.05m?

a) 450cm b) 4050mm c) 0.0405km d) 40.5cm

10. Which of the following is the smallest?

a) 0.002m b) 0.7cm c) 0.000003km d) 4mm

Fluency Practice

A1 Convert 26 mm into cm	**A2** Convert 740 cm into mm	**A3** Convert 970 m into km	**A4** Convert 32 m into cm
B1 Convert 380 cm into m	**B2** Convert 420 m into mm	**B3** Convert 34 km into m	**B4** Convert 63 mm into m
C1 Convert 21 km into cm	**C2** Convert 58 cm into km	**C3** Convert 3.6 km into mm	**C4** Convert 495 cm into km
D1 Convert 373 mm into cm	**D2** Convert 429 mm into km	**D3** Convert 8500 mm into m	**D4** Convert 19 km into mm
E1 Convert 528 km into cm	**E2** Convert 32.7 km into m	**E3** Convert 7 cm into km	**E4** Convert 9400 mm into km

Fluency Practice

Question 8: Convert the following into grams

(a) 2 kg (b) 7 kg (c) 19 kg (d) 20 kg

(e) 1.5 kg (f) 2.4 kg (g) 4.7 kg (h) 0.5 kg

(i) 0.8 kg (j) 0.16 kg (k) 0.03 kg (l) 0.008 kg

Question 9: Convert the following into kilograms

(a) 7000 g (b) 3000 g (c) 12000 g (d) 40000 g

(e) 3945 g (f) 600 g (g) 850 g (h) 735 g

(i) 60 g (j) 75 g (k) 2 g (l) 78.1 g

Question 10: Convert the following into kilograms

(a) 5 tonnes (b) 8 tonnes (c) 15 tonnes (d) 0.6 tonnes

(e) 1.6 tonnes (f) 9.25 tonnes (g) 0.3 tonnes (h) 0.06 tonnes

Fluency Practice

learn by heart

1 kilogram (kg) = 1000 grams	1 tonne (t) = 1000 kg

exercise

1. Fill in the gaps:

   a) 2500g = _____kg

   b) _____g = 0.9kg

   c) _____g = 3.8kg

   d) 9450g = _____kg

   e) _____g = 0.02kg

   f) 0.043kg = _____g

   g) 3.5 tonnes = _____kg

   h) _____kg = 3060g

   i) 450kg = _____tonnes

   j) 10,000g = _____tonnes

2. Which of these could be the weight of an apple?

   a) 7.8g b) 78g c) 780g d) 7.8kg

3. Which of these are impossible?

   a) A real car that weighs 500g.

   b) A full grown man that weighs 90kg.

   c) A laptop computer weights 150kg.

   d) A suitcase full of clothes weighs 30kg.

   e) A recipe to make cake for 10 people uses 1kg of flour.

4. Which of these could be the weight of an elephant?

   a) 6km b) $6kg^2$ c) 6 tonnes d) 60kg e) 60g f) $6\ km^2$

5. Fill in the blanks with >, < or =

   a) 360g _____ 3kg

   b) 490kg _____ 4 tonnes

   c) 0.06kg _____ 600g

   d) 1050g _____ 10.5kg

Fluency Practice

Question 11: Convert the following into millilitres

(a) 2 litres (b) 6 litres (c) 24 litres (d) 1.8 litres

(e) 0.6 litres (f) 0.125 litres (g) 0.07 litres (h) 2.05 litres

Question 12: Convert the following into litres

(a) 8000 ml (b) 3000 ml (c) 76000 ml (d) 750 ml

(e) 540 ml (f) 121 ml (g) 88 ml (h) 1035 ml

Fluency Practice

1) Convert 576 litres to cl.

2) Convert 553 cl to ml.

3) Convert 270 litres to cl.

4) Convert 654 litres to cl.

5) Convert 90.1 cl to ml.

6) Convert 4700 cl to litres.

7) Convert 170 ml to cl.

8) Convert 1100 ml to cl.

9) Convert 7300 cl to litres.

10) Convert 5700 cl to litres.

Fluency Practice

learn by heart

Capacity: *the amount that something can hold, measured in ml or litres.*	1 litre (l) = 1000 millilitres (ml)	1 litre (l) = 100 centilitres (cl)

exercise

1. Fill in the gaps:

   a) 3500ml = _____l

   b) _____ml = 4l

   c) _____ml = 3.6l

   d) 400ml = _____l

   e) _____ml = 0.2l

   f) 8.4l = _____cl

   g) 20.7l = _____ml

   h) _____l = 42cl

   i) 0.95l = _____ml

   j) 52,000ml = _____l

2. Fill in the blank: 0.2 l + 45ml = _____ l

3. Which of these might be the capacity of a can of cola?

   a) 3ml b) 30ml c) 300ml d) 3 *litres* e) 30 *litres*

4. Which is bigger, 1cl or 1ml?

5. Which of the following is $\frac{1}{100}$ of a litre?

   a) 1 ml b) 1 cl c) 100 ml d) 10 cl

6. Fill in the blanks with >, < or =

   a) 4 cl _____ 10 ml

   b) 6 l _____ 750ml

   c) 250cl _____ 0.4l

   d) 3.8l _____380cl

7. Which of these could be the capacity of a swimming pool?

   a) 3l b) 300ml c) 300,000l d) 3,000,000 l

Fluency Practice

examples

Convert 150 minutes to hours

1 hour = 60 minutes,
150 ÷ 60 = 2.5

How many minutes is $\frac{1}{10}$ of an hour?

1 hour = 60 minutes,
60 ÷ 10 = 6 minutes

Convert 3.2 hours to minutes

1 hour = 60 minutes,
3.2 × 60 = 192 minutes

exercise 7n

1. Convert each of these to minutes:

a) 5 hours

b) $\frac{1}{2}$ an hour

c) $\frac{1}{10}$ of an hour

d) 2.5 hours

e) 4 hours & 15 minutes

f) $1\frac{1}{4}$ hours

g) $\frac{3}{4}$ of an hour

h) 3.25 hours

i) $3\frac{1}{5}$ hours

j) 0.3 hours

k) $1\frac{3}{5}$ hours

l) 2.9 hours

2. Convert each of the following times to hours and minutes.

a) 110 mins

b) 70 mins

c) 345 mins

d) 420 mins

3. Match each time interval below with a time in minutes from the boxes on the right.

A 2 hours 15 mins	B 2 hours 35 mins	C $1\frac{3}{4}$ hours
D 1 hour 40 mins	E 3 hours 5 mins	F $3\frac{1}{2}$ hours
G 1 hour 20 mins	H $3\frac{1}{4}$ hours	I 3 hours
J $1\frac{1}{2}$ hours	K 1 hour 55 mins	L $2\frac{1}{2}$ hours

185 mins	90 mins
155 mins	180 mins
195 mins	100 mins
210 mins	135 mins
150 mins	80 mins
105 mins	115 mins

A	B	C	D	E	F	G	H	I	J	K	L

4. Put these times in order, starting with the shortest:

a) 1.2 hours

b) 65 minutes

c) $1\frac{1}{3}$ hours

d) 1.3 hours

Fluency Practice

examples

The time is 17:45.
What time will it be in 20 minutes?
15 minutes will make 18:00,
so it will be 18:05

Work out the number of minutes
between 13.48 and 14.25
60 - 48 = 12
12 + 25 = 37 minutes

exercise 7o

1. Each of the following times are given in 24-hour clock format.
Convert each to 12-hour clock format. The first one is done for you.

a) 14 28 2:28 pm b) 13 15 c) 07 45

d) 18 30 e) 11 28 f) 21 40

g) 04 10 h) 00 50 i) 12 33

2. Each of the following times are given in 12-hour clock format.
Convert each to 24-hour clock format. The first one is done for you.

a) 3:27 pm 15 27 b) 8:23 am c) 8:56 pm

d) 10:20 pm e) 3:00 am f) 6:30 pm

g) 12:08 am h) 12:38 pm i) 11:17 pm

3. Which of these times are in the afternoon? Circle all that apply.

a) 9:04 am b) 15.01 c) 13.30 d) 4pm

4. Work out how many minutes there are between:

a) 14.05 & 15.00 b) 11.10 & 12.00 c) 10.02 & 11.05

d) 18.12 & 19.00 e) 10.06 & 10.45 f) 12.35 & 13.12

5. The time is 13.05. What time will it be in 55 minutes?

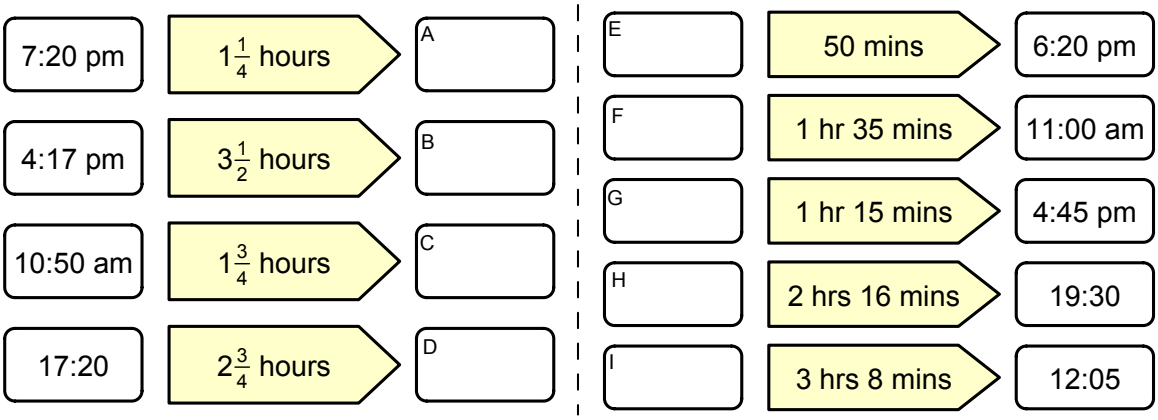
6. The time is 14.25. How many minutes is it until 3pm?

7. The time is quarter past three in the afternoon. What time will it be in 20 minutes?

8. The time is 15.15. How many minutes is it until 5pm?

Fluency Practice

9. Each flow diagram shows a starting time, an interval and an end time.
Work out the missing parts:



10. A film starts at 7:30pm and lasts 110 minutes. At what time does the film finish?

11. It takes Sam $1\frac{1}{4}$ hours to travel to work. Sam set off for work at 8:50am.
At what time did Sam arrive at work?

12. At an activity day, there are three sessions, each lasting 45 minutes.

    a) Work out the total duration of the three sessions.

    b) The first session starts at 10:30 am and there are no gaps between the sessions.
    Work out the time at which the last session ends.

13. A theatre show consists of two acts with a 20 minute interval.
The first act is 1 hour 10 minutes long and the second act is 55 minutes long.
The show starts at 7:30pm.
Work out the finishing time of the show.

14. It takes 40 minutes for Claudia to travel from home to work.
Claudia is due to start work at 10:30 am. Work out the lastest time that she could leave home in order to arrive at work on time.

15. Rebecca arrived at the gym at 3:50pm.
She stayed at the gym for 1 hour and 20 minutes, then walked home.
It took Rebecca $\frac{3}{4}$ hour to walk home. At what time did Rebecca get home?

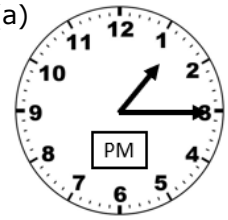
16. Rob started gardening at 11:45 am and finished at 2:00 pm.
During this time, Rob took a 20 minute break.
How long was Rob gardening for?

17. Patients can book an appointment to see a doctor for ten minutes.
In the morning, the doctor sees patients between 8:50 am and 11:30 am.
The doctor also takes a 20 minute break during this time.
Work out how many patients the doctor can see in the morning.

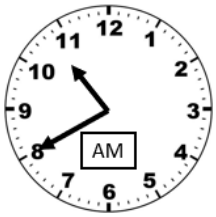
Fluency Practice

Write down the times shown. Give them in both 12-hour (am/pm) and 24-hour clock format.

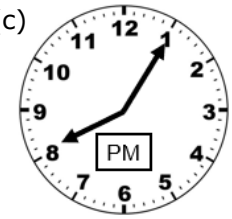
(a)



(b)



(c)



(d)

(a) An overnight train sets off at 10 pm and arrives at 5.30 am. How long, in hours and minutes, is the journey?
(b) A TV programme starts at 5.35 pm and finishes at 7.12 pm. How long, in minutes, is the programme?
(c) A factory worker starts his shift at 8.12 am and finishes it at 4.43pm. How long, in hours and minutes, is his shift?

(a) Younis starts watching a film at 5.45 pm. The film lasts 2 hours 27 minutes. What time does the film finish?
(b) A plane takes off at 3.40 am. The length of the flight is 10 hours 45 minutes. What time does the plane land?
(c) A concert lasts 3 hours 27 minutes. The concert finishes at 9.58 pm. What time did the concert start?

(a) What time is 1500 seconds after 16:10?
(b) What time is 2100 seconds before 15:45?

Fluency Practice

In each box, cross off pairs of time intervals that are **equal** to each other.
Circle the time interval that is left over.
Times shown are in hours (h) and minutes (m).

A

$\frac{1}{2}$h	6m	$\frac{1}{4}$h
45m	30m	$\frac{3}{4}$h
15m	$\frac{1}{10}$h	50m

B

10m	15m	$\frac{1}{5}$h
60m	$\frac{1}{6}$h	12m
$\frac{1}{3}$h	20m	1h

C

$\frac{1}{20}$h	8m	9m
4m	5m	$\frac{1}{15}$h
$\frac{1}{12}$h	$\frac{3}{20}$h	3m

D

$\frac{3}{5}$h	42m	35m
$\frac{5}{6}$h	36m	$\frac{2}{3}$h
40m	$\frac{7}{12}$h	50m

E

0.25h	6m	30m
24m	40m	0.1h
0.5h	0.4h	15m

F

0.3h	20m	0.4h
42m	24m	18m
0.6h	36m	0.7h

G

$1\frac{1}{2}$h	$1\frac{1}{3}$h	$\frac{9}{10}$h
150m	$1\frac{1}{5}$h	90m
80m	54m	72m

H

$1\frac{2}{3}$h	63m	$1\frac{1}{15}$h
$1\frac{1}{10}$h	105m	100m
64m	$1\frac{1}{20}$	$1\frac{3}{4}$h

I

$1\frac{9}{10}$h	$2\frac{1}{4}$h	108m
$1\frac{4}{5}$h	135m	$1\frac{7}{10}$h
130m	$2\frac{1}{6}$h	102m

J

$0.\dot{3}$h	18m	$0.\dot{6}$h
40m	36m	33m
0.6h	0.3h	20m

K

1.4h	114m	1.8h
108m	84m	75m
1.9h	1.6h	1.25h

L

$1.\dot{3}$h	1.1h	2.5h
100m	80m	$1.\dot{6}$h
150m	120m	66m

Fluency Practice

Convert the following:

(a) 800 cm into m (b) 500 cm into m

(c) 1500 cm into m (d) 520cm into m

(e) 6 m into cm (f) 13 m into cm

(g) 6.7 m into cm (h) 5.82 m into cm

Convert the following:

(a) 4000m into km (b) 7000m into km

(c) 7600m into km (d) 8625m into km

(e) 3 km into m (f) 3.2 km into m

(g) 4.56 km into m (h) 1.87 km into m

Convert the following:

(a) 5 cm into mm (b) 80 cm into mm

(c) 3.5 cm into mm (d) 8.9 cm into mm

(e) 20 mm into cm (f) 45 mm into cm

(g) 31 mm into cm (h) 17 mm into cm

Convert the following:

(a) 6 kg into g (b) 6.7 kg into g

(c) 6.82 kg into g (d) 0.75 kg into g

(e) 2000 g into kg (f) 2800 g into kg

(g) 1750 g into kg (h) 600 g into kg

Convert the following

(a) 2000 ml into L (b) 4500 ml into L

(c) 6 L into ml (d) 7.8 L into ml

In a 100 m race, when the winner crossed the finish line, the runner in last place had covered 91.72 m. What was the gap in cm between the first and last runners?

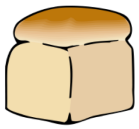
Extension

Question 1: Jack is 1.36 metres tall.
His friend Ian is 5 centimetres taller than Jack.
What height is Ian? Give your answer in metres.

Question 2: Mary runs 600m every day.
Work out how far Mary runs in one week.
Give your answer in kilometres.

Question 3: Karl is baking a loaf of bread and needs 0.8 kg of flour
He has 72 grams of flour.
How much more flour does Karl need?
Give your answer in grams.

Question 4: James and Jack buy a 3 litre carton of orange juice.
Each boy drinks 650 ml of orange juice.
How much orange juice is left?
Give your answer in litres.



Question 5: Rebecca has two dogs, Lucky and Pepe.
Lucky weighs 5.4 kilograms.
Pepe is 800 grams lighter than Lucky.
Work out how much Pepe weighs.
State your units.

Question 6: A 2p coin has a mass of 7 grams.
Find the total mass of £80 worth of 2p coins.
Give your answer in kilograms.

Maths Venns

Less than 4ft 2 inches
If you think a region is impossible to fill, convince me why!
More than 1600mm
Between 1 and 2 metres
Give a length in **cm** that could belong in each of the regions
A
B
C
D
E
F
G
H

3 Properties of 2D Shapes

Fluency Practice

Question 1: Draw the following shapes

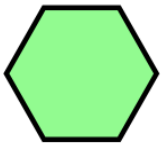
(a) A square (b) A rectangle (c) A circle (d) A triangle

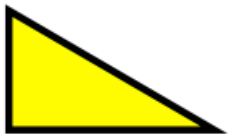
(e) A semi-circle (f) A pentagon (g) An octagon (h) A hexagon

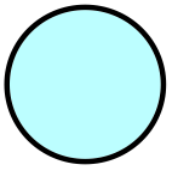
(i) A decagon (j) A heptagon

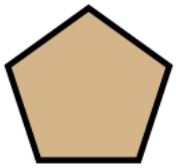
Question 2: Name each of the shapes below

(a) 

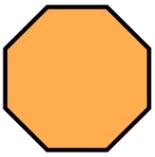
(b) 

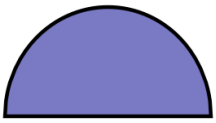
(c) 

(d) 

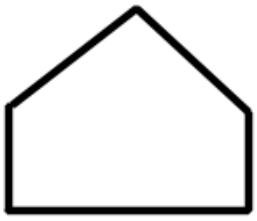
(e) 

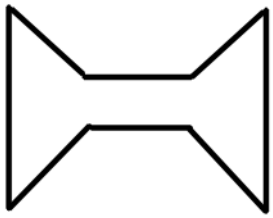
(f) 

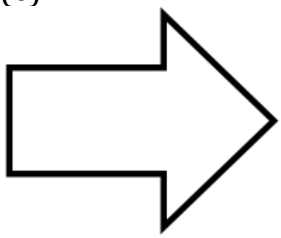
(g) 

(h) 

Question 3: Name each of the polygons below

(a) 

(b) 

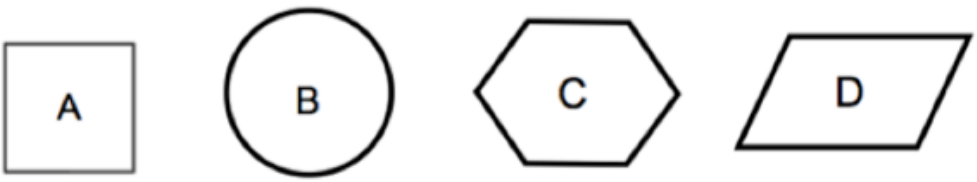
(c) 

Extension

Question 1: Draw 4 different hexagons.

Question 2: Below is a picture of a street.
Write down any 2D shapes you see and what they are in the picture.

Question 3: Can you spot any mistakes below?



(a) Name shape A — Square (1)

(b) Name shape B — Circle (1)

(c) Name shape C — Pentagon (1)

(d) Name shape D — Diamond (1)

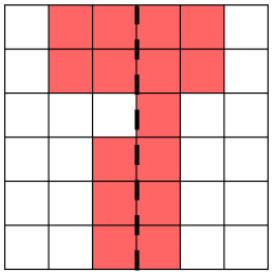
Fluency Practice

Line Symmetry

Add the number of squares specified so that the lines shown are all lines of symmetry

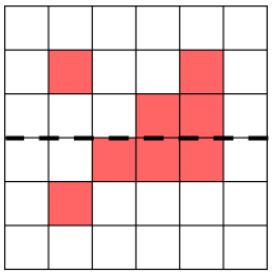
(a)

Add one square



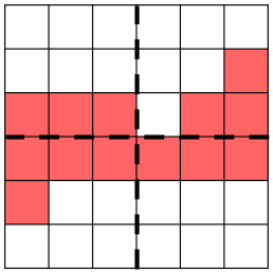
(b)

Add two squares



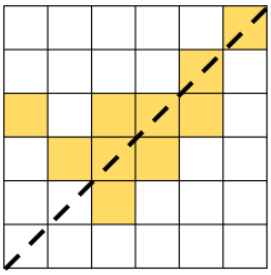
(c)

Add three squares



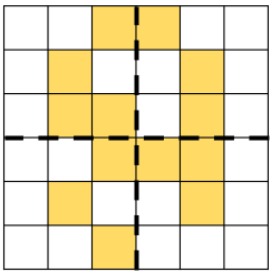
(d)

Add two squares



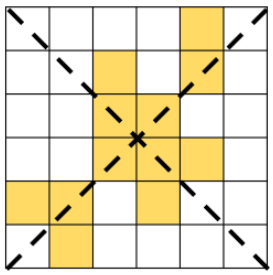
(e)

Add three squares



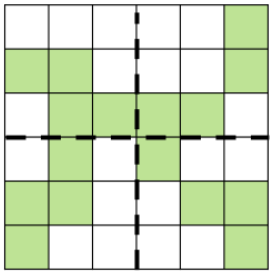
(f)

Add two squares



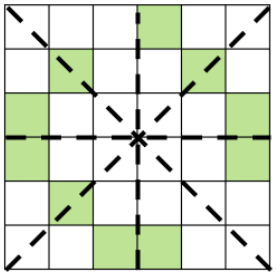
(g)

Add four squares



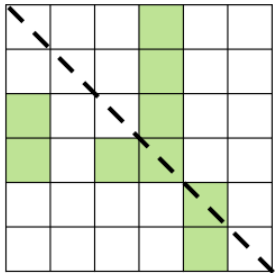
(h)

Add two squares



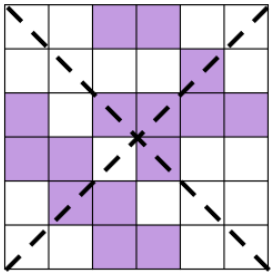
(i)

Add three squares



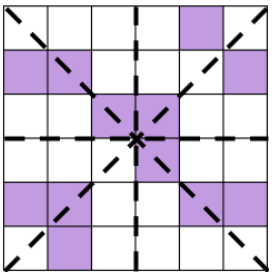
(j)

Add three squares



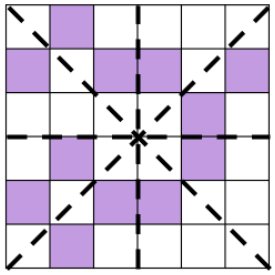
(k)

Add four squares



(l)

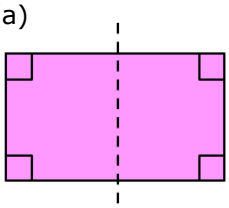
Add four squares



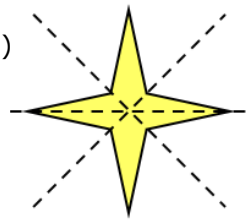
Fluency Practice

Add the missing line of symmetry to each of these shapes.

(a)



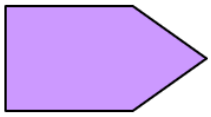
(b)



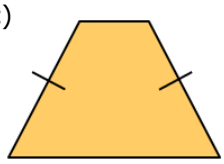
Draw all the lines of symmetry on each of these shapes.

(a)

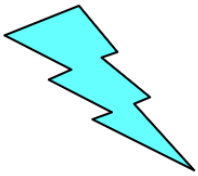
(b)



(c)

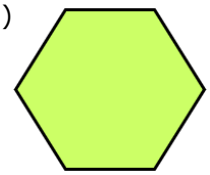


(d)

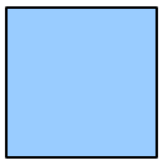


Draw all the lines of symmetry on each of these regular polygons.

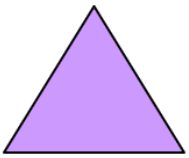
(a)



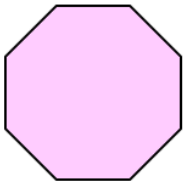
(b)



(c)

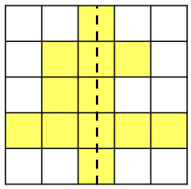


(d)

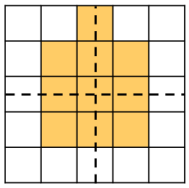


Add one square to each of these shapes so that they have the lines of symmetry shown.

(a)



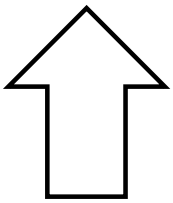
(b)

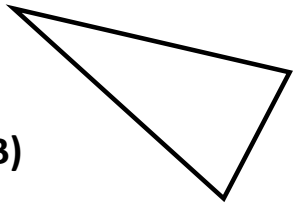


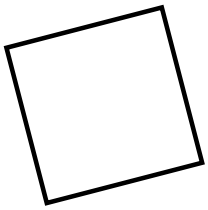
Fluency Practice

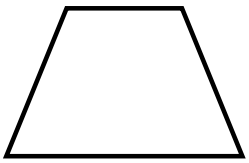
Shape Symmetry

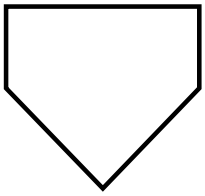
Draw the lines of symmetry for each shape.
How many lines of symmetry does each shape have?
Watch out! Some shapes have NO lines of symmetry!

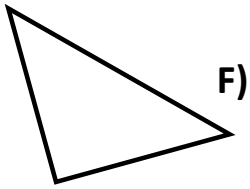
A) 

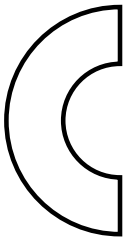
B) 

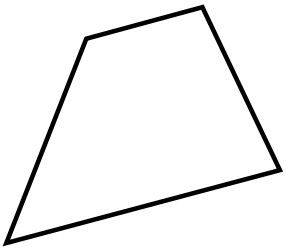
C) 

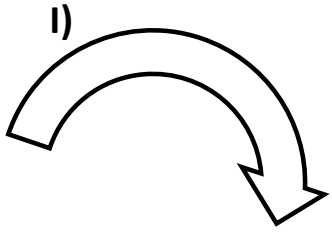
D) 

E) 

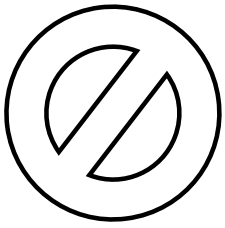
F) 

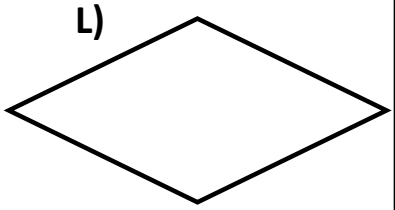
G) 

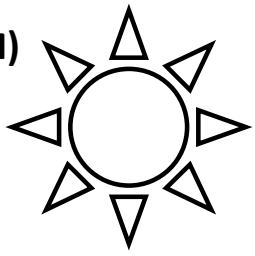
H) 

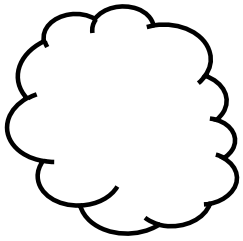
I) 

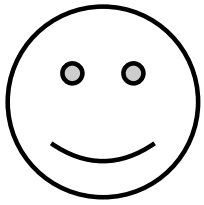
J) 

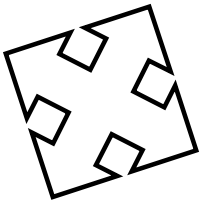
K) 

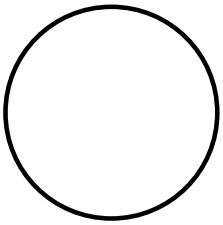
L) 

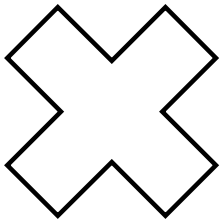
M) 

N) 

O) 

P) 

Q) 

R) 

Challenge

Question 1

How many letters of the word **MATHEMATICS** do not have any lines of symmetry?

Question 2

The diagram shows a poster which Beatrix has (this way up!) on her wall. When Beatrix was standing on her head, looking in a mirror on the opposite wall at the poster on the wall behind her, how many letters could still be read in the normal way?

Question 3

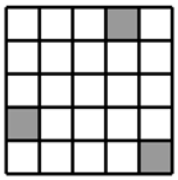
The diagram shows a pattern made from matchsticks stuck to a piece of card. What is the smallest number of matchsticks that need to be added so that the resulting pattern has a line of symmetry?

Question 4

The diagram shows a weaver's design for a *rihlélo*, a winnowing tray from Mozambique. How many lines of symmetry does the design have?

Question 5

What is the smallest number of *additional* squares which must be shaded so that this figure has at least one line of symmetry *and* rotational symmetry of order 2?



Question 6

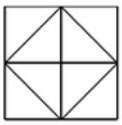
Each of the nine small squares in this grid can be coloured completely black or completely white.
What is the largest number of squares that can be coloured black so that the design created has rotational symmetry of order 2, but no lines of symmetry?

Question 7

The figure shows an equilateral triangle divided into small equilateral triangles, all equal. What is the lowest number of small triangles which must now be shaded to produce a figure which has a line of symmetry?

Question 8

A square is divided into eight congruent triangles, as shown. Two of these triangles are selected at random and shaded black. What is the probability that the resulting figure has at least one line of symmetry?

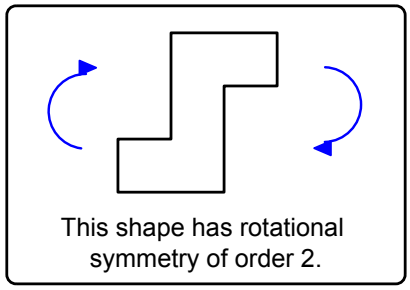


Fluency Practice

learn by heart

A shape has **rotational symmetry** if it looks exactly the same after rotating by less than a full turn.

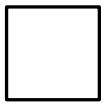
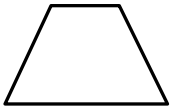
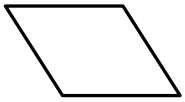
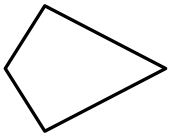
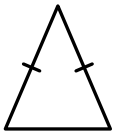
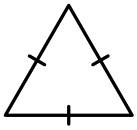
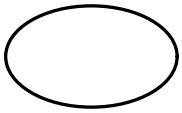
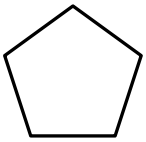
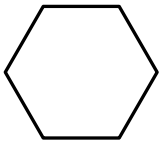
A shape's **order of rotational symmetry** is the number of times it looks the same in a full turn.



This shape has rotational symmetry of order 2.

exercise 3f

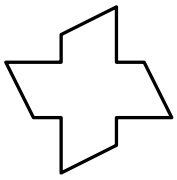
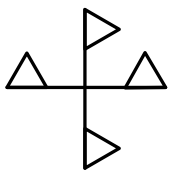
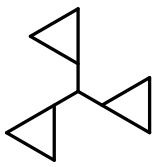
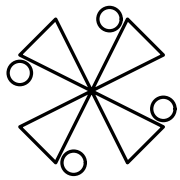
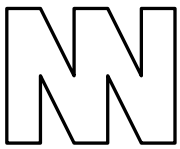
1. State the order of rotational symmetry of each shape, or write 'none' if the shape has no rotational symmetry.

				
Square	Rectangle	Trapezium	Parallelogram	Kite
				
Isosceles Triangle	Equilateral Triangle	Ellipse	Regular Pentagon	Regular Hexagon

2. State the order of rotational symmetry of a regular octagon.

3. Sketch a hexagon with a rotational symmetry of order 2.

4. State the order of rotational symmetry of each drawing, or write 'none' if the drawing has no rotational symmetry.

5. D E G H I M N S U W X Z

   a) Which of the letters have rotational symmetry?

   b) Which of the letters have rotational symmetry **and** at least 1 line of symmetry?

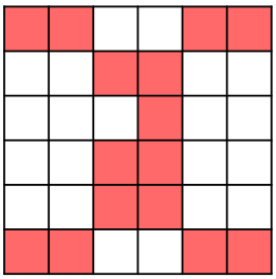
Fluency Practice

Rotational Symmetry

Add the number of squares specified to get the required order of rotational symmetry.

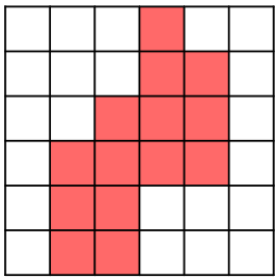
(a)

Add one square for order 2



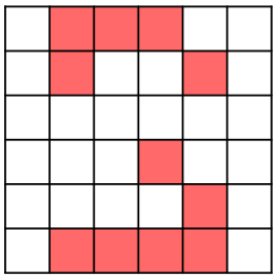
(b)

Add two squares for order 2



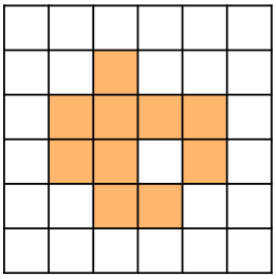
(c)

Add 3 squares for order 2



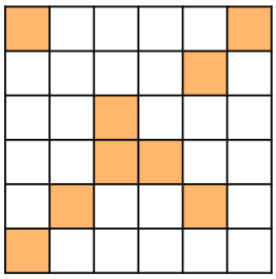
(d)

Add two squares for order 4



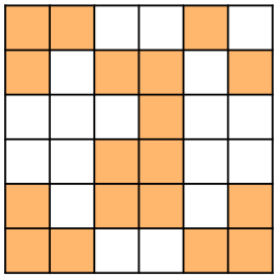
(e)

Add 3 squares for order 4



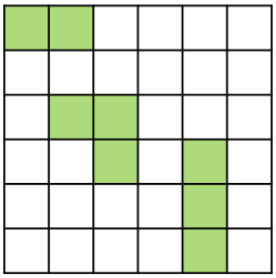
(f)

Add two squares for order 2



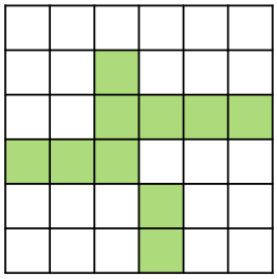
(g)

Add 4 squares for order 2



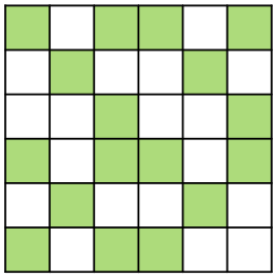
(h)

Add two squares for order 4



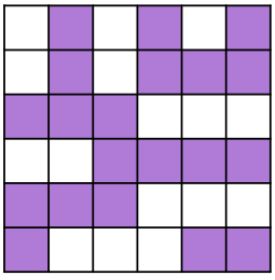
(i)

Add 3 squares for order 4



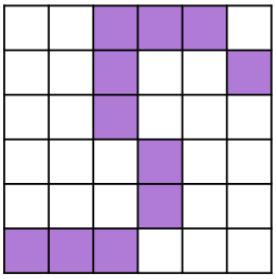
(j)

Add 4 squares for order 4



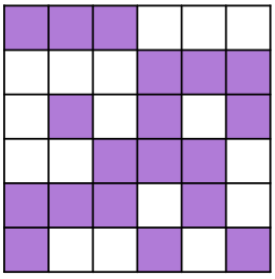
(k)

Add 3 squares for order 2



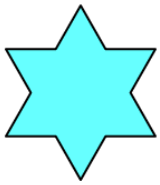
(l)

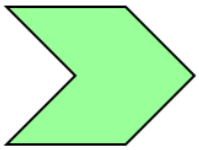
Add 5 squares for order 4

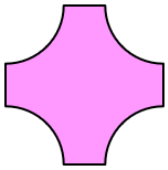


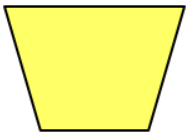
Fluency Practice

Write down the order of rotational symmetry of each of these shapes.

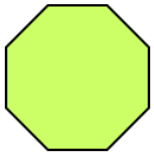
(a) 

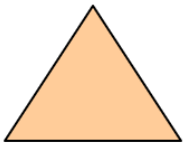
(b) 

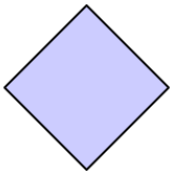
(c) 

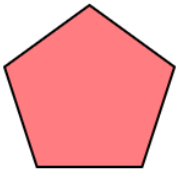
(d) 

Write down the order of rotational symmetry of these regular polygons.

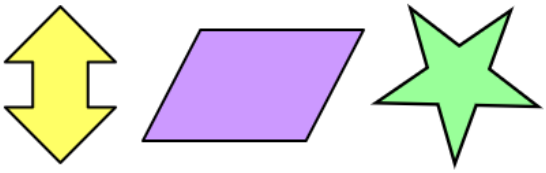
(a) 

(b) 

(c) 

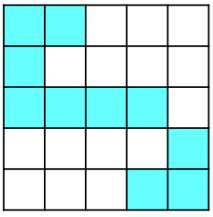
(d) 

Which of these shapes does not have the same number of lines of symmetry as its order of rotational symmetry?

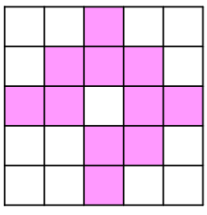


Add one square to each shape so that is has rotational symmetry of order shown.

(a) Order 2



(b) Order 4

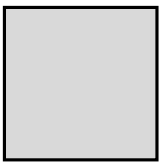


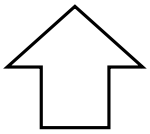
Fluency Practice

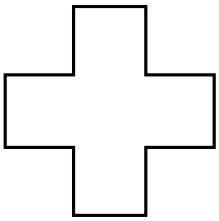
Rotational Symmetry

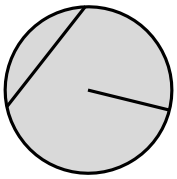
For each shape, write down its order of rotational symmetry.

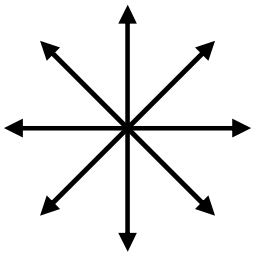
A 

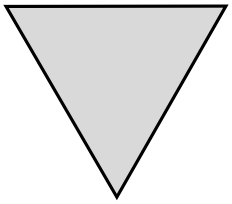
B 

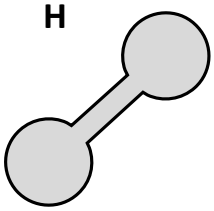
C 

D 

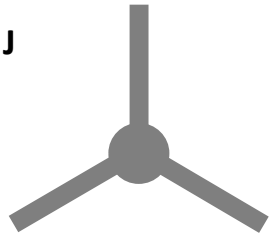
E 

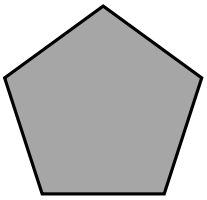
F 

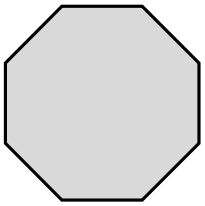
G 

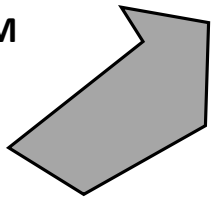
H 

I 

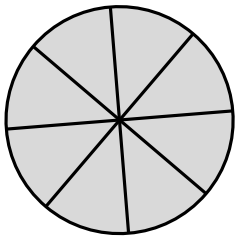
J 

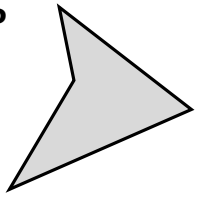
K 

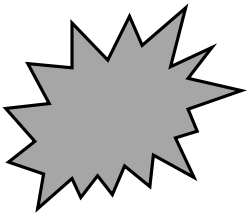
L 

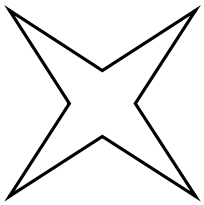
M 

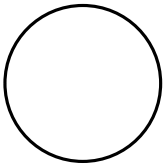
N 

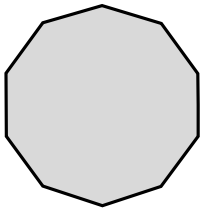
O 

P 

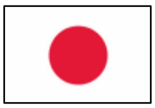
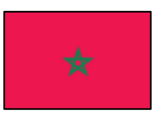
Q 

R 

S 

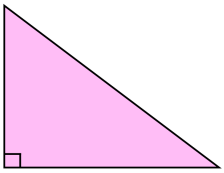
T 

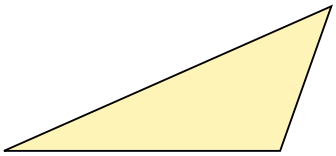
Fluency Practice

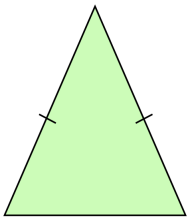
Flags of the World Symmetry					
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	
	Country			Country	
	Number of Lines of Symmetry			Number of Lines of Symmetry	
	Order of Rotational Symmetry			Order of Rotational Symmetry	

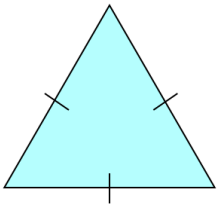
Fluency Practice

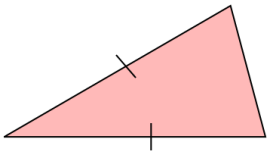
Question 1: Write down what type of triangle each picture shows.

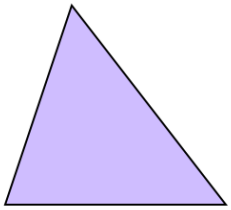
(a) 

(b) 

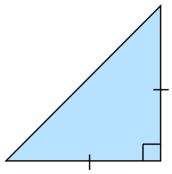
(c) 

(d) 

(e) 

(f) 

Question 2: What type of triangle shown below?



Question 3: Draw a right angle triangle

Question 4: Draw an isosceles triangle

Question 5: Draw a scalene triangle

Question 6: Draw an equilateral triangle

Extension

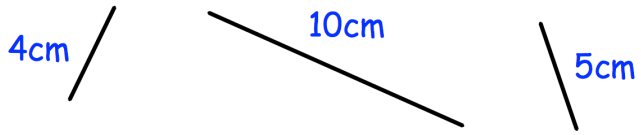
Question 1: Daniel has drawn a triangle with sides of length 5cm, 5cm and 8cm.
What type of triangle has he drawn?

Question 2: Charlotte has drawn a triangle with angles of 60°, 60° and 60°.
What type of triangle has she drawn?

Question 3: Is each statement below True or False?

(a) Scalene triangles have 3 lines of symmetry
(b) Isosceles triangles have 1 line of symmetry
(c) A right angle triangle can have a line symmetry

Question 4: Lily has 3 different wooden sticks.
Explain why she cannot make a triangle using the sticks.



Question 5: Liam says he has drawn a triangle with one acute angle, one right angle and one obtuse angle.

Explain why Liam must be wrong.

Triangles. Draw up a table like this (big enough to contain *drawings*):

	scalene	**isosceles**	**equilateral**
acute-angled			
obtuse-angled			
right-angled			

For the top left square, if a triangle can be both scalene and acute-angled, draw an example. Put X if it's impossible, and try to say why. Complete the table.

Extension

Quadrilateral Diagonals

Name each **quadrilateral pair** and then **draw** their **diagonals**.

Do the diagonals follow any **rules** where they cross, like intersecting angles or bisected (halved) lengths?

Are these properties **always** the same?

Mark your diagrams with the correct symbols showing equal lengths.

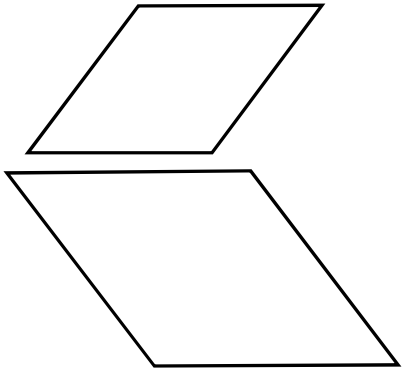
Quadrilateral Name: _____

Diagonal Rules: _____

_____

_____

Quadrilateral Name: _____

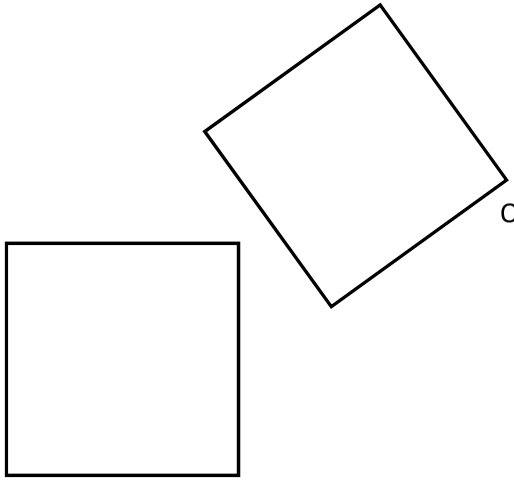


Diagonal Rules: _____

_____

_____

Quadrilateral Name: _____

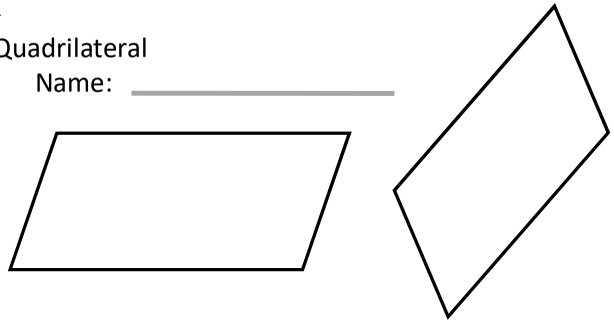


Diagonal Rules: _____

_____

_____

Quadrilateral Name: _____

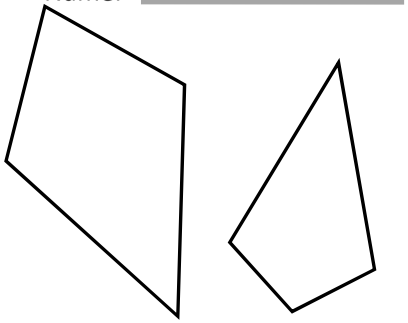


Diagonal Rules: _____

_____

_____

Quadrilateral Name: _____



Diagonal Rules: _____

_____

_____

Fluency Practice

Question 1: Draw the following quadrilaterals

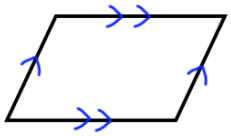
(a) A kite (b) A rectangle (c) A square (d) A parallelogram

(e) A trapezium (f) A rhombus (g) An arrowhead/A delta

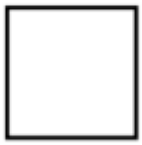
Question 2: Name each of the shapes below

(a)

(b)



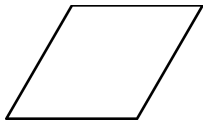
(c)



(d)

(e)

(f)



Question 3: Draw all lines of symmetry on the quadrilaterals you have drawn in Question 1.

Question 4: Write down the order of rotational symmetry that each quadrilateral below has:

(a) A square (b) A rectangle (c) A kite (d) A parallelogram

(e) A trapezium (f) A rhombus

Question 5: Which quadrilaterals have only one pair of equal length sides?

Question 6: Which quadrilaterals have two pairs of equal length sides?

Question 7: Which quadrilaterals have four equal length sides?

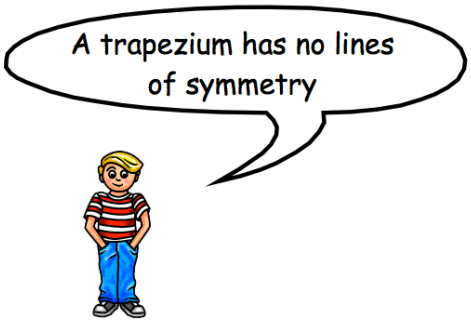
Question 8: Which quadrilaterals have two pairs of parallel sides?

Question 9: Which quadrilaterals have one pair of parallel sides?

Question 10: Which quadrilaterals have diagonals of equal length?

Extension

Question 1: Explain why Martin is incorrect.



Question 2: Can you spot any mistakes?

Below is a rectangle.

Tick the correct boxes for the four statements.

	True	False
A rectangle has four right angles	☑	☐
A rectangle has one pair of parallel lines	☑	☐
A rectangle has four lines of symmetry	☑	☐
A rectangle has rotational symmetry of order 2	☑	☐

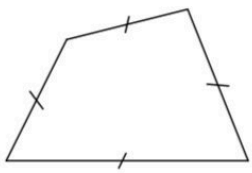
Extension

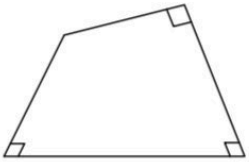
What Quadrilateral am I?

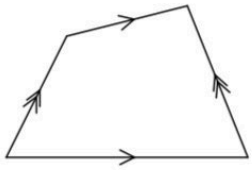
The following quadrilaterals have not been drawn to scale, but each one has some markings that tell you something about it. If you used the information to construct the quadrilateral, but didn't include any additional features that have not been shown, what is the best name for the quadrilateral?
Here are the choices:

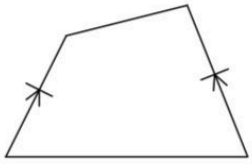
quadrilateral, kite, trapezium, parallelogram, rhombus, rectangle, square

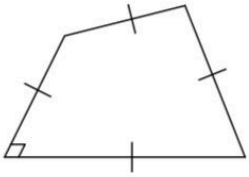
Write the best name for the quadrilateral on each diagram.

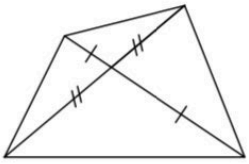
1. 

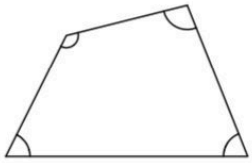
2. 

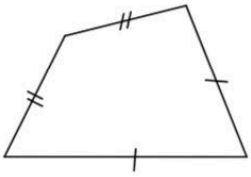
3. 

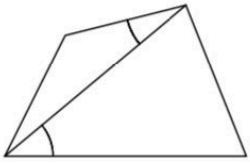
4. 

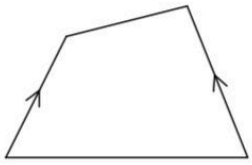
5. 

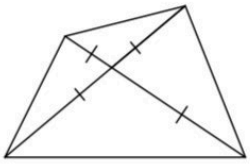
6. 

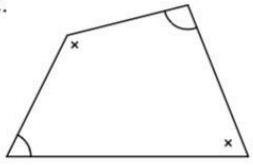
7. 

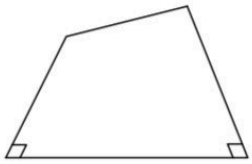
8. 

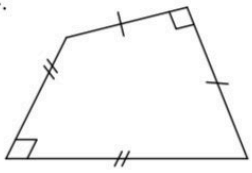
9. 

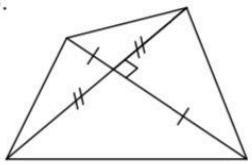
10. 

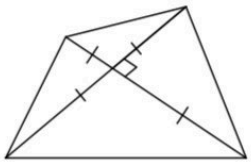
11. 

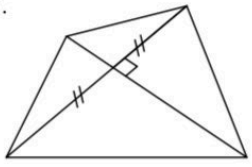
12. 

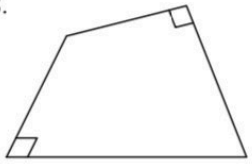
13. 

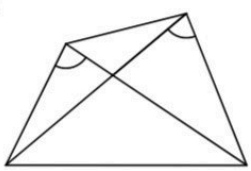
14. 

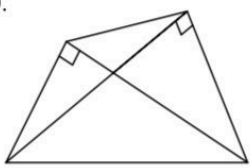
15. 

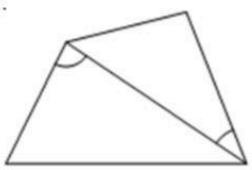
16. 

17. 

18. 

19. 

20. 

21. 

Fluency Practice

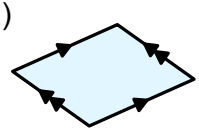
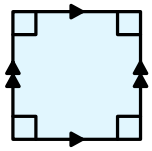
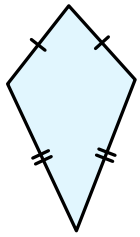
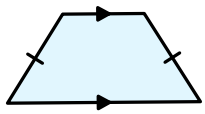
learn by heart

Quadrilateral: *4 sided shape*	Parallelogram : *Opposite sides are parallel*
Rectangle : *parallelogram with 4 right angles*	Square : *4 right angles & all sides equal*

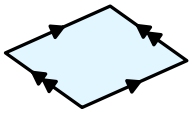
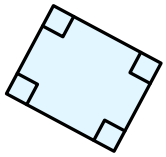
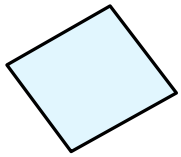
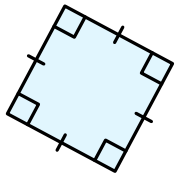
Rectangles & Squares are special parallelograms

exercise 8b

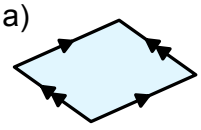
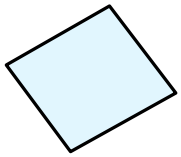
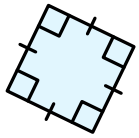
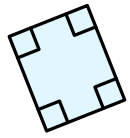
1. Which of the shapes below are parallelograms? Circle 2 answers.

a)  b)  c)  d) 

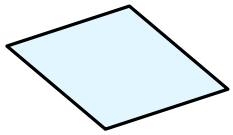
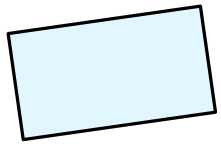
2. Which of the shapes below are rectangles? Circle 2 answers.

a)  b)  c)  d) 

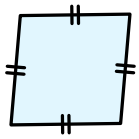
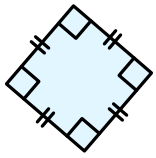
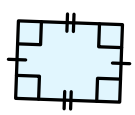
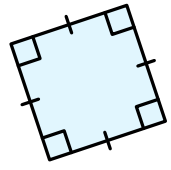
3. Which of these shapes are squares?

a)  b)  c)  d) 

4. Draw arrows on the parallel sides of these parallelograms:

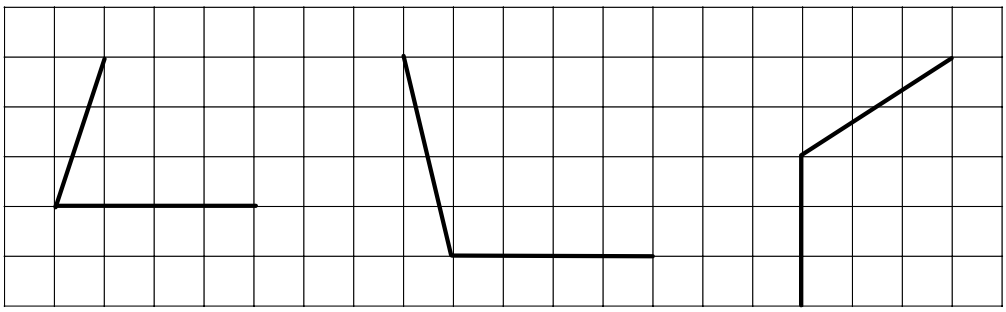
 

5. Which of these shapes are squares? Circle 2 answers.

a)  b)  c)  d) 

Fluency Practice

6. On the grid draw in extra lines to make 3 parallelograms:



7. True or False?

a) A square has four equal sides.

b) The sides of a square are perpendicular to each other.

c) A square is a type of parallelogram.

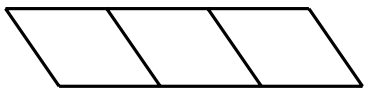
d) A rectangle always has four equal sides.

e) The opposite sides of a rectangle are parallel.

f) A parallelogram can have four equal sides.

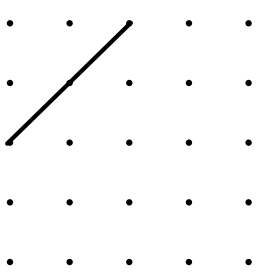
g) You can cut a parallelogram in half to make two triangles.

8. How many parallelograms are in the picture?

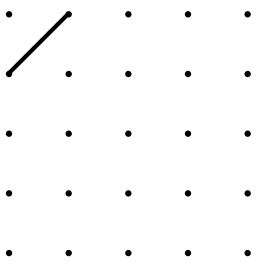


9. Complete the lines draw to show each shape:

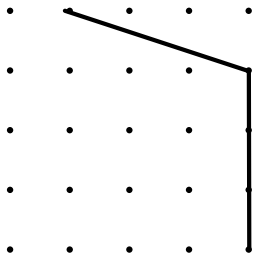
a) Square



b) Rectangle



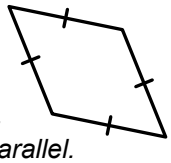
c) Parallelogram



Fluency Practice

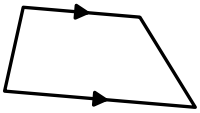
learn by heart

Rhombus



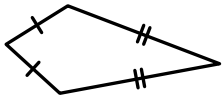
Four equal sides.
Opposite sides parallel.

Trapezium



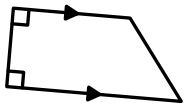
One pair of parallel sides.

Kite

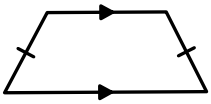


Two pairs of adjacent sides equal.

Right-angled Trapezium

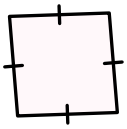


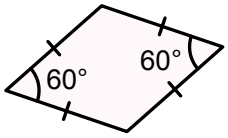
Isosceles Trapezium

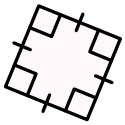


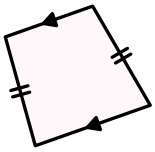
exercise 8c

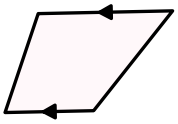
1. State whether each of these shapes is a rhombus, kite or trapezium:

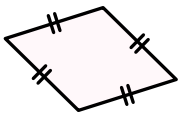
a) 

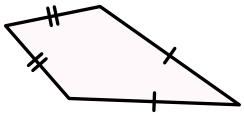
b) 

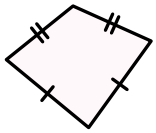
c) 

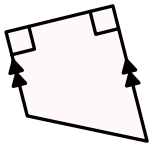
d) 

e) 

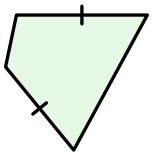
f) 

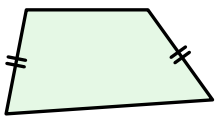
g) 

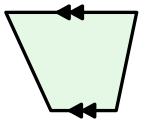
h) 

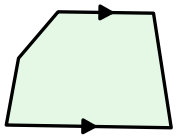
i) 

2. Which of these is a trapezium?

a) 

b) 

c) 

d) 

3. Sketch a parallelogram and a trapezium.
   Explain the difference between these two shapes.

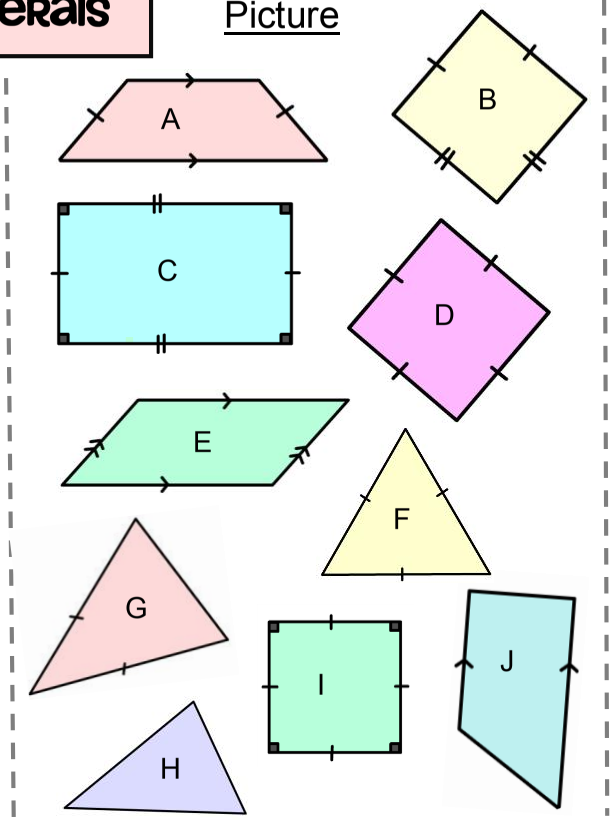
Triangles & Special Quadrilaterals

Can you match these shapes to their descriptions?
Record your answers in the table.

Description

1. A shape with 3 sides and no equal angles.
2. A quadrilateral with four equal angles and four equal sides.
3. A quadrilateral with one pair of parallel sides.
4. A shape with 3 sides and two equal angles.
5. A shape with equal opposite angles.
6. Any quadrilateral with four equal sides.
7. A shape with one pair of parallel sides and two equal sides.
8. A shape with four 90 degree angles but not all sides equal.
9. When you cut this shape in half, you get two isosceles triangles.
10. A shape with 3 equal angles.

Picture



Name

K) Isosceles Triangle

L) Square

M) Kite

N) Trapezium

O) Equilateral Triangle

P) Rectangle

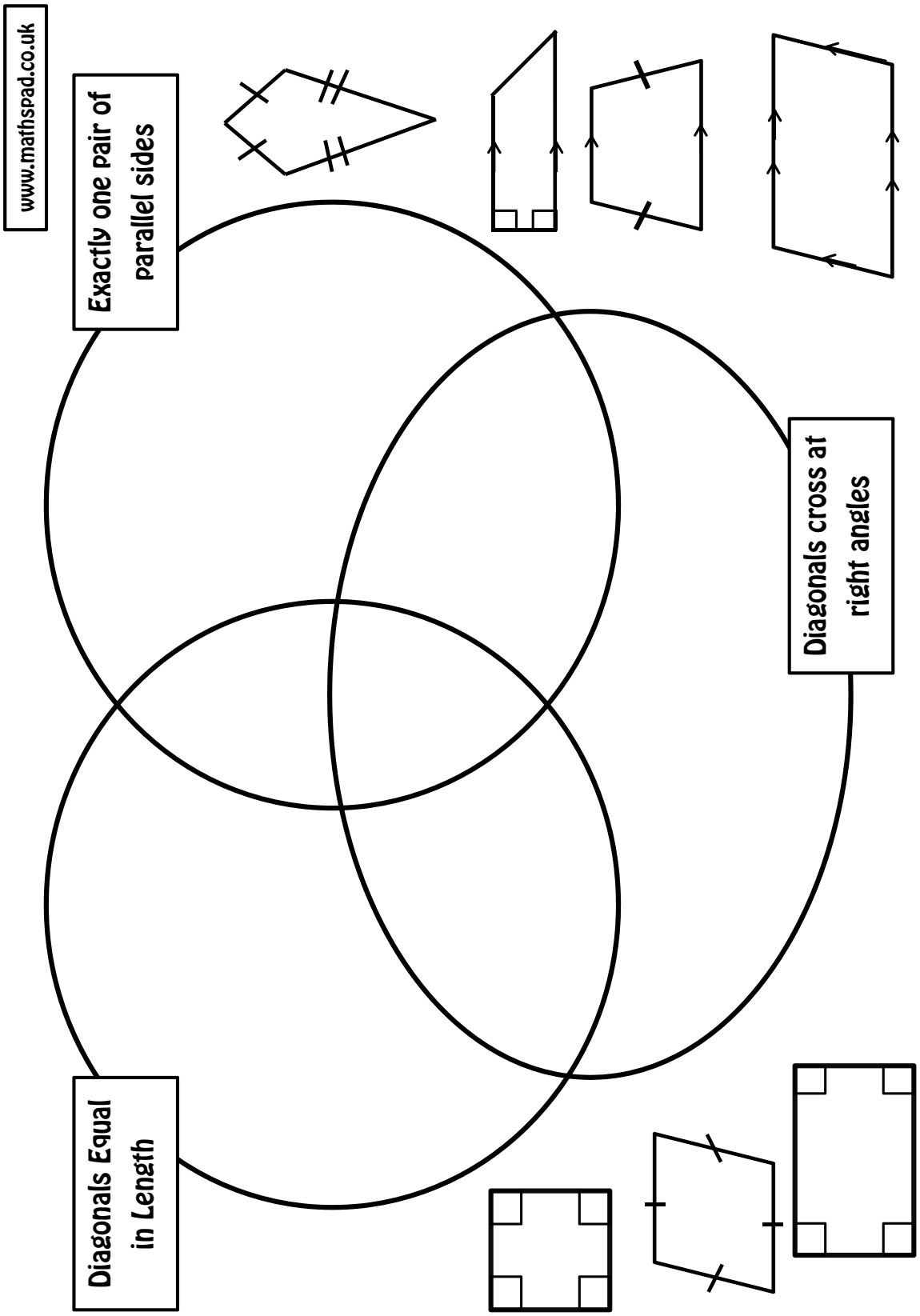
Q) Scalene Triangle

R) Parallelogram

S) Isosceles Trapezium

T) Rhombus

Descrip-tion	1	2	3	4	5	6	7	8	9	10
Picture										
Name										


www.mathspad.co.uk
Exactly one pair of parallel sides
Diagonals cross at right angles
Diagonals Equal in Length

Always, Sometimes, Never

1. A square is a rectangle.	2. The diagonals of a rhombus are perpendicular.	3. A rectangle is a square.
4. A rhombus is a square.	5. A trapezoid has opposite sides parallel.	6. A square is a rhombus.
7. A parallelogram is a rectangle.	8. A trapezoid has legs congruent.	9. A square has opposite angles congruent.
10. A parallelogram has congruent diagonals.	11. A rectangle has perpendicular diagonals.	12. A rhombus is a rectangle.
13. A parallelogram is a quadrilateral.	14. A parallelogram has diagonals that bisect each other.	15. A rectangle is a rhombus.
16. A rhombus has congruent diagonals.	17. A parallelogram has diagonals that bisect angles.	18. The diagonals of a rhombus are congruent.

More-Same-Less

Instructions: Complete the remaining boxes with quadrilaterals by making the minimum change possible to the centre box. If there are boxes that cannot be filled in, say why.

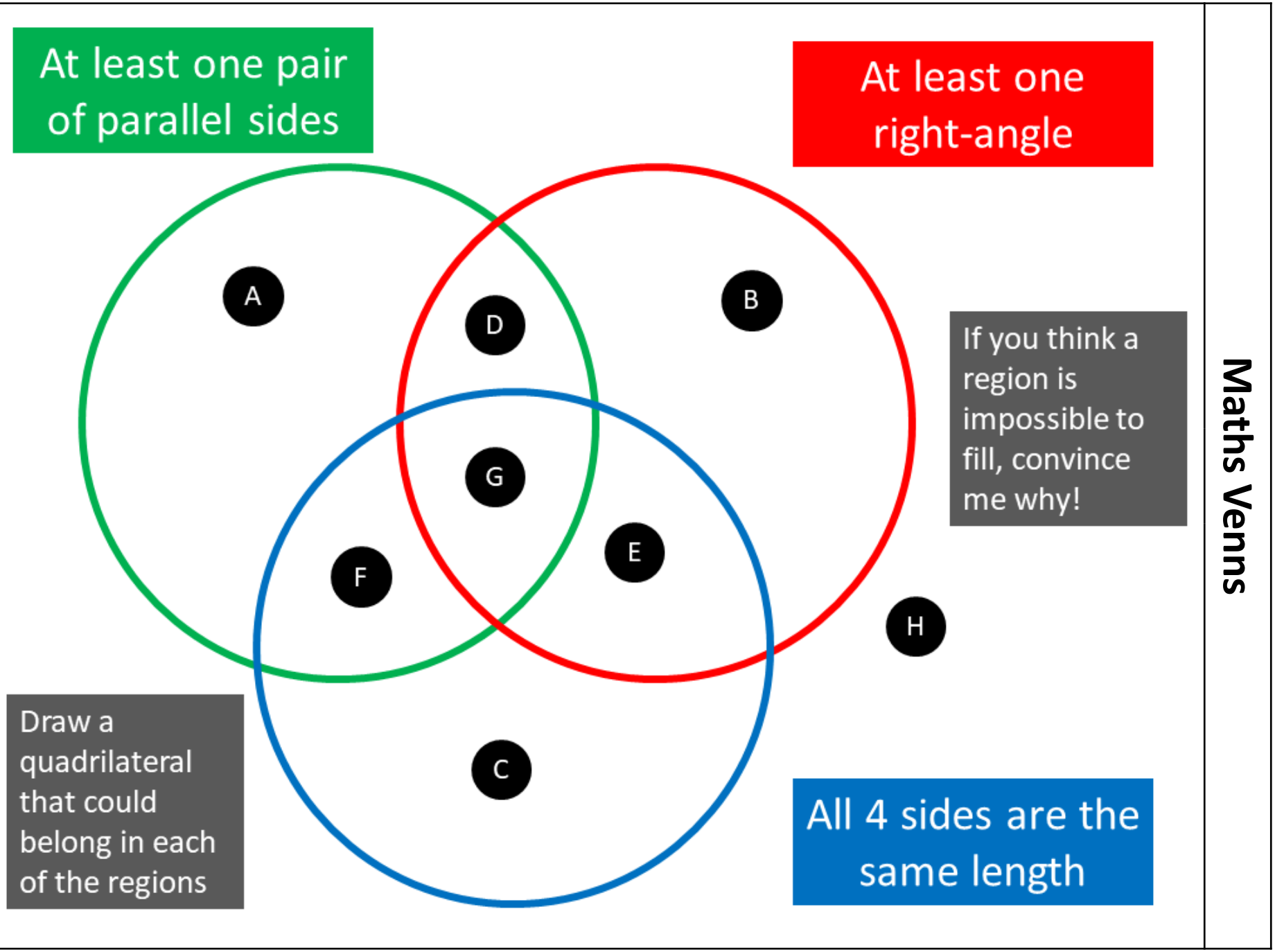
Number of perpendicular sides

	Less	Same	More
More			
Same			
Less			

Number of parallel sides

Maths Venns

Diagonals cross at right-angles
If you think a region is impossible to fill, convince me why!
Diagonals are equal length
Exactly one pair of parallel sides
Draw a quadrilateral that could belong in each of the regions
A
B
C
D
E
F
G
H


At least one pair of parallel sides
At least one right-angle
A
D
B
G
E
F
H
C
If you think a region is impossible to fill, convince me why!
Draw a quadrilateral that could belong in each of the regions
All 4 sides are the same length
Maths Venns

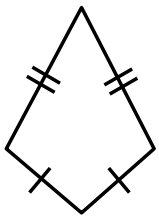
Maths Venns

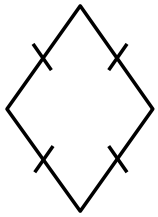
Diagonals Are Perpendicular
If you think a region is impossible to fill, convince me why!
Diagonals Are Congruent
Diagonals Bisect Each Other
Think of a quadrilateral that could belong in each of the regions
A
B
C
D
E
F
G
H

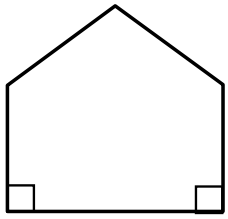
Problem Solving

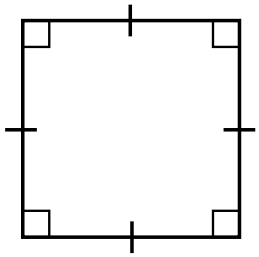
Cut out the nine shape cards and arrange them into a 3×3 grid using the clues below:

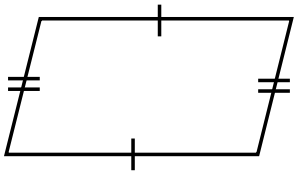
1. The equilateral shapes are all in different columns.
2. Each shape in the middle row has two sets of parallel lines.
3. The shapes in the top two corners each have exactly one line of symmetry.
4. One of the rows contains a total of 10 sides.
5. The square is in a corner below the parallelogram.
6. The shape in the centre has all angles the same, but its diagonals do not intersect at right angles.
7. The shape with two pairs of equal adjacent sides is not in the same column as the square.
8. The shape with the most sides is in the bottom right hand corner.

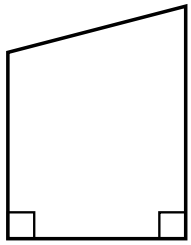


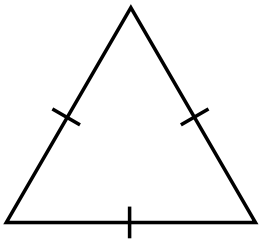


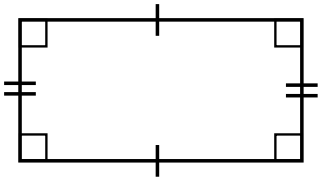


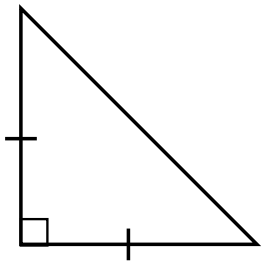












sketch the shape

1) a triangle with a right angle that is isosceles	2) an isosceles triangle with one obtuse angle	3) a parallelogram made up of two isosceles right angled triangles	4) a trapezium made up of a square and an isosceles triangle	5) a hexagon with just one line of symmetry and with five right angles	6) a hexagon with two lines of symmetry and two reflex angles
7) a quadrilateral with perpendicular diagonals and two pairs of equal sides	8) a pentagon with two sides parallel, one reflex angle and one line of symmetry	9) a hexagon made up of four isosceles right angled triangles	10) a quadrilateral with just one line of symmetry which does not pass through any of the vertices (corners)	11) four congruent (identical) kites surrounding a point	12) a quadrilateral with diagonals that bisect each other
13) an octagon with rotational symmetry, order 2 and with six right angles	14) an octagon with (exactly) five right angles	15) a hexagon with one line of symmetry (only) and two right angles	16) a kite that is a trapezium	17) an octagon with four lines of symmetry (only)	18) an octagon with one line of symmetry (only)
19) a hexagon with only rotational symmetry, order 2	20) a quadrilateral with two equal length diagonals and 1 reflex angle	21) a heptagon with only one line of symmetry and four right angles	22) a decagon with only two lines of symmetry	23) a hexagon with only rotational symmetry, order 3	24) a dodecagon with only four lines of symmetry

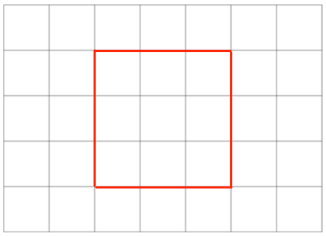
Extension

4 Area and Perimeter

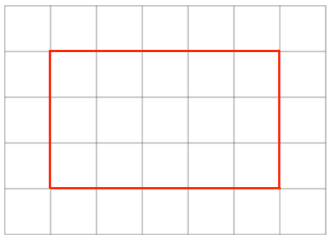
Fluency Practice

Question 1: The following shapes are drawn on centimetre-squared paper.
Find the perimeter of each shape.

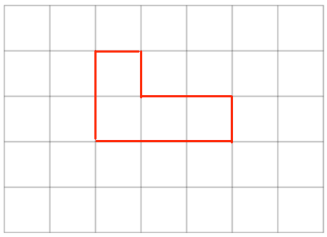
(a)



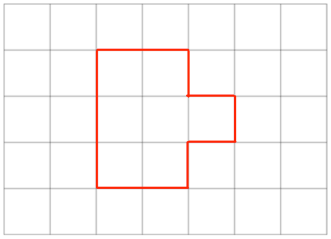
(b)



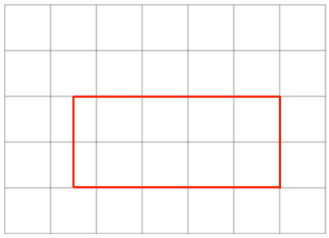
(c)



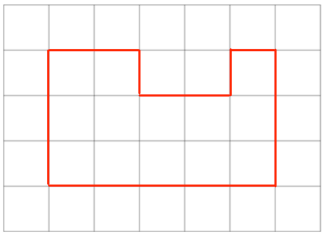
(d)



(e)

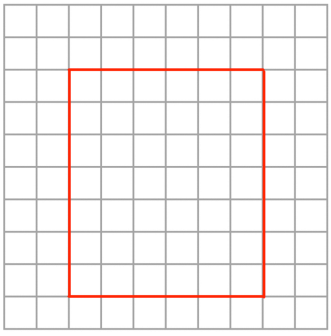


(f)

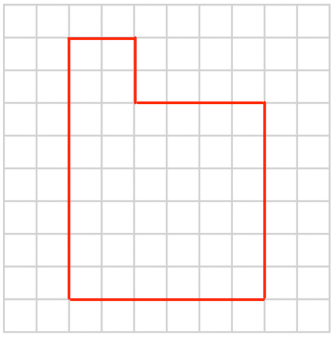


Question 2: The following shapes are drawn on centimetre-squared paper.
Find the perimeter of each shape.

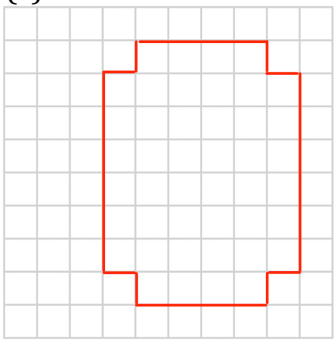
(a)



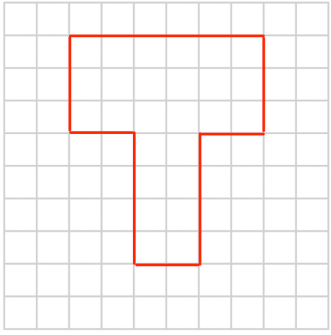
(b)



(c)



(d)



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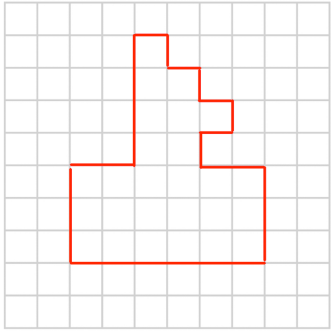

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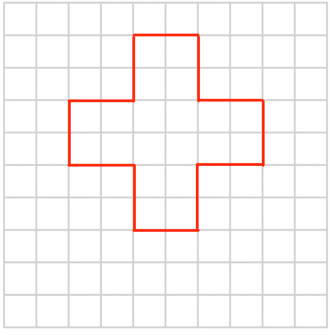


Extension

Question 1: On centimetre-square paper, draw a rectangle with a perimeter of 14cm

Question 2: On centimetre-square paper, draw three different rectangles with an perimeter of 18cm

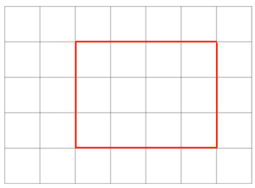
Question 3: A square has a perimeter of 24cm.
(a) Draw this square on centimetre-square paper.
(b) Find the area of the square.

Question 4: A rectangle has an area of $12cm^2$.
(a) Draw three possible rectangles on centimetre-square paper.
(b) Find the perimeter of three rectangles.

Question 5: A square has an area of $49cm^2$
(a) Draw this square on centimetre-square paper.
(b) Find the perimeter of the square.

Question 6: Draw a shape that has one line of symmetry and a perimeter of 10cm

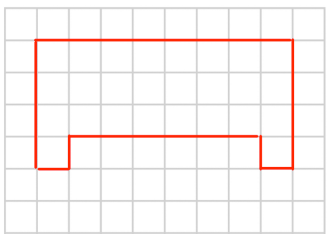
Question 7: Jasmine says the perimeter of this shape is 12cm.
Explain her mistake.



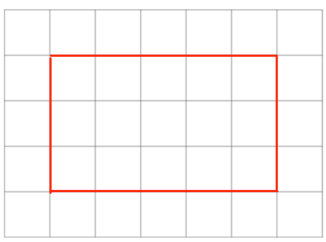
Question 8: An "equable" shape is a shape where the area and perimeter of the shape have the same numerical value.

The shape shown has an area of $26cm^2$
and a perimeter of 26cm.

Draw four more equable shapes.

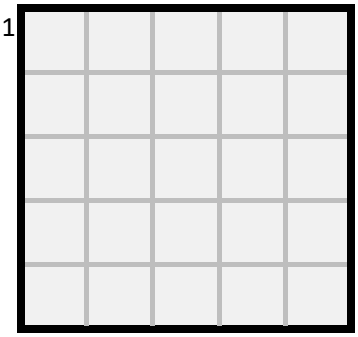


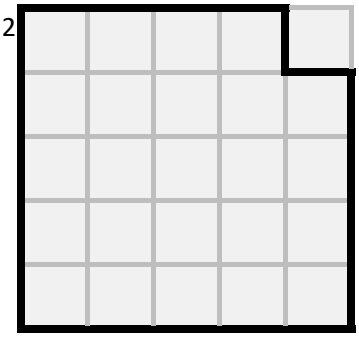
Question 9: Martin has drawn the shape below.
He says it is possible to draw a shape with the same area but a larger perimeter.
Show Martin is correct.

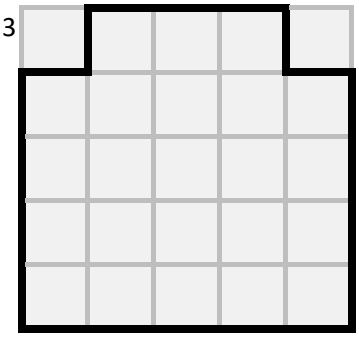


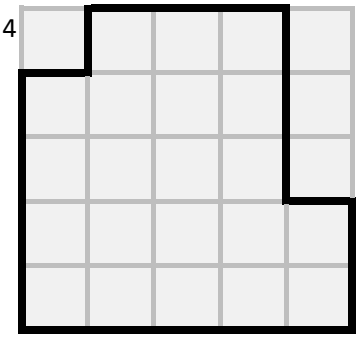
Intelligent Practice

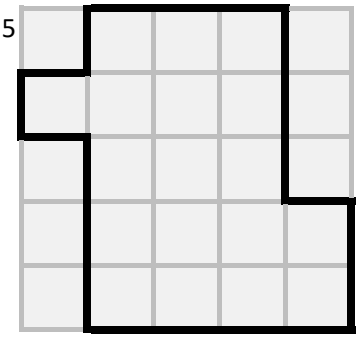
In each question, a section of the shape gets nibbled away. Find the perimeter of each shape.

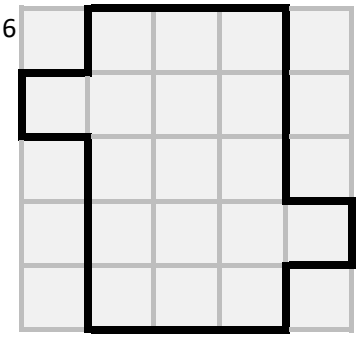
1 

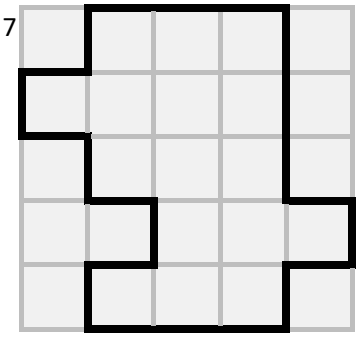
2 

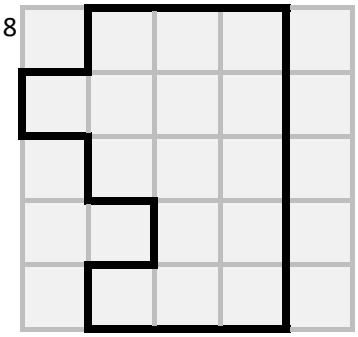
3 

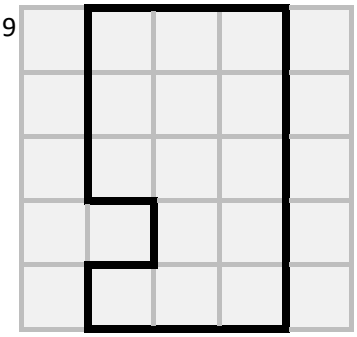
4 

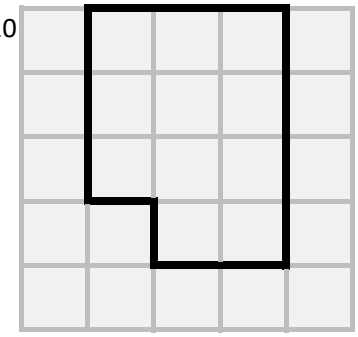
5 

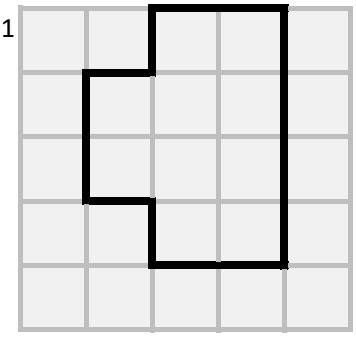
6 

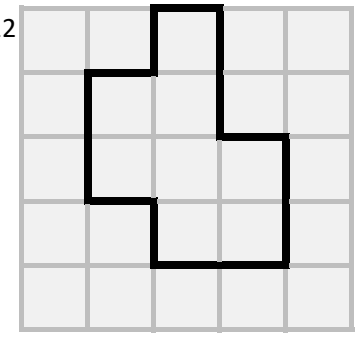
7 

8 

9 

10 

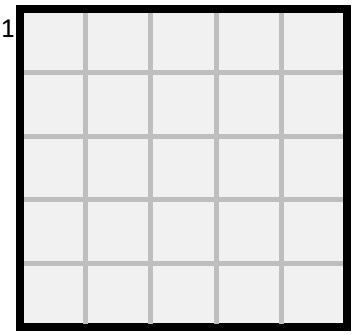
11 

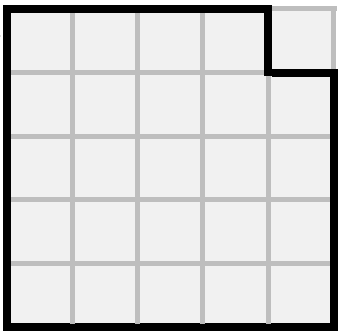
12 

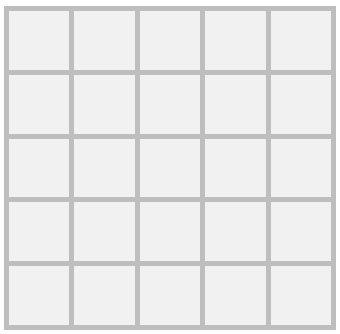
Intelligent Practice

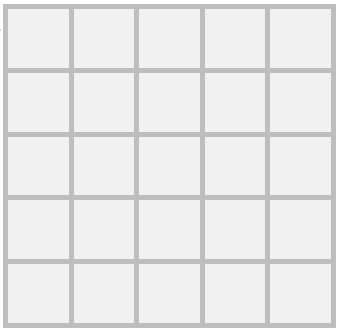
For each question, nibble off one square

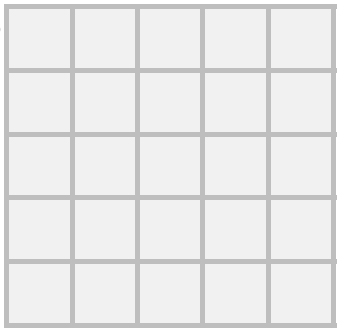
each time but keep the same perimeter

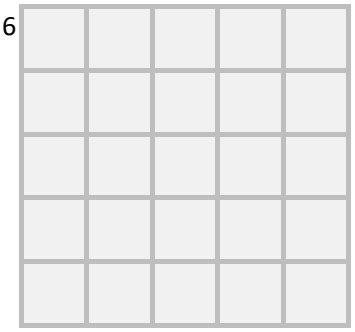
1 

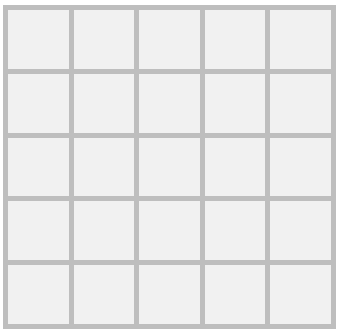
2 

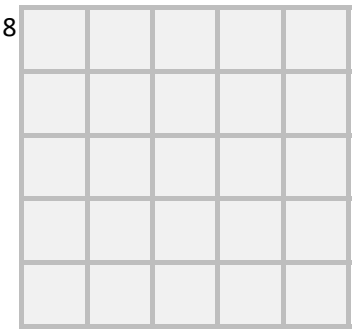
3 

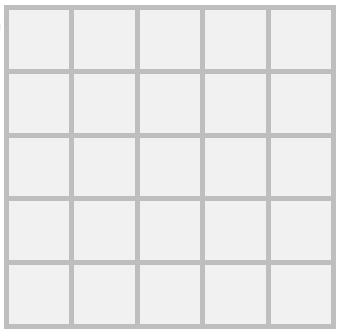
4 

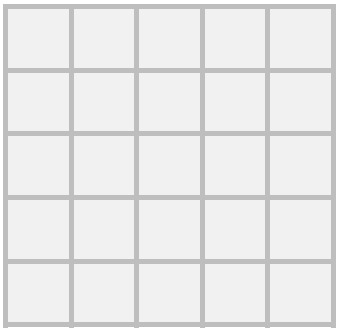
5 

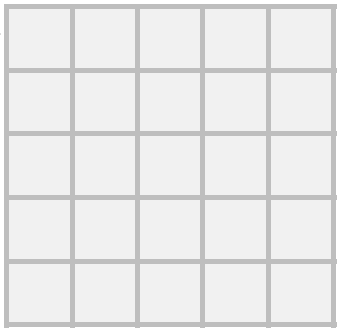
6 

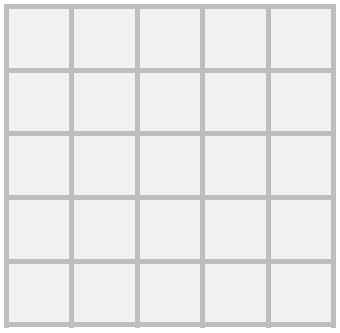
7 

8 

9 

10 

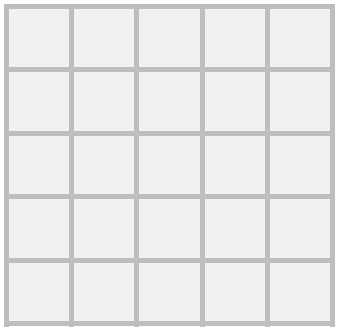
11 

12 

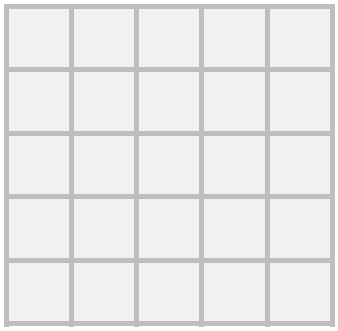
Intelligent Practice

For each question, draw a shape using the following instructions on the grids below

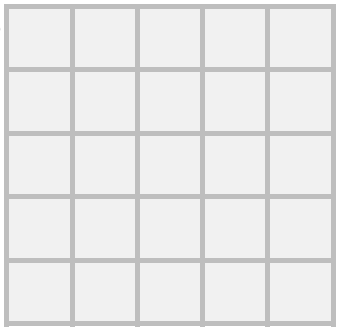
1) Draw a shape where the value of the perimeter is more than the number of squares used.

1 

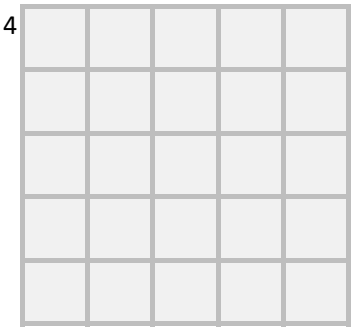
2) Draw a shape where the value of the perimeter is less than the number of squares used.

2 

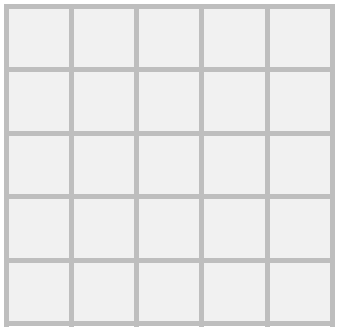
3) Draw a shape where the value of the perimeter is equal to the number of squares used.

3 

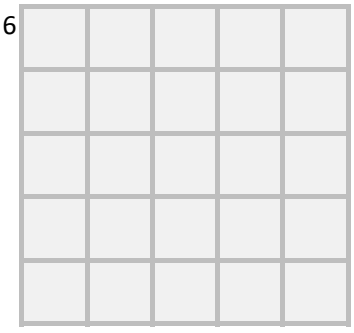
4) Draw a shape where the value of the perimeter is three times larger the number of squares used.

4 

5) Draw a shape where the value of the perimeter is twice as large the number of squares used.

5 

6) The largest perimeter you can make on a 5 by 5 grid has a length of 34. Draw a shape with a perimeter of 34 units.

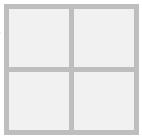
6 

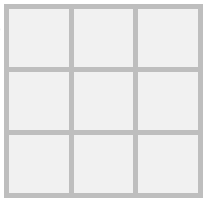
Intelligent Practice

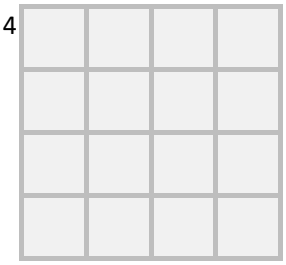
For each grey grid, find the maximum

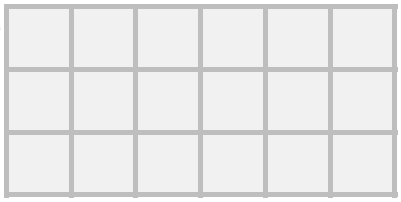
perimeter shape that will fit inside it

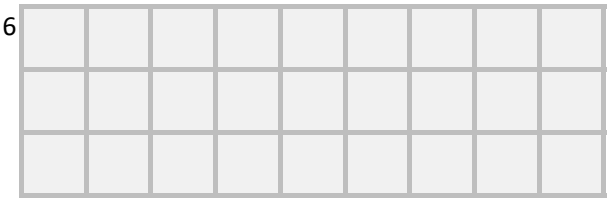
1 

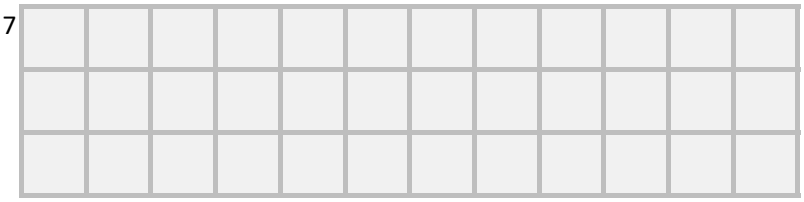
2 

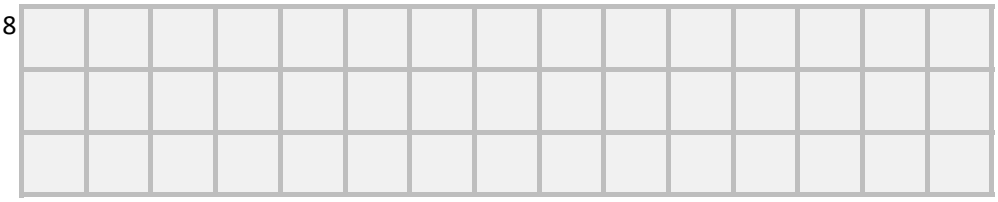
3 

4 

5 

6 

7 

8 

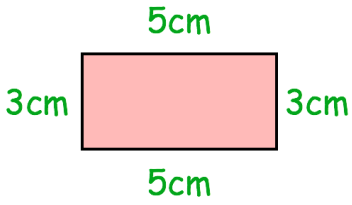
9) Without drawing them, can you use what you know from your answers to questions 5-8 to predict the maximum perimeters for grey grids that are:

a) 3x18 b) 3x21 c) 3x30

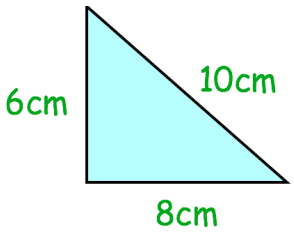
Fluency Practice

Question 1: Work out the perimeter of each shape below

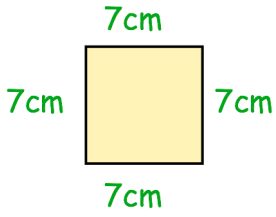
(a)



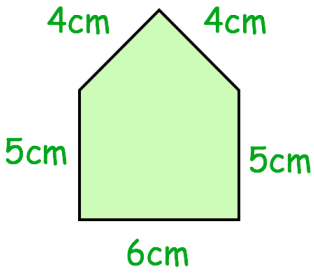
(b)



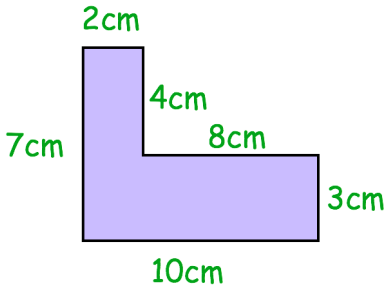
(c)



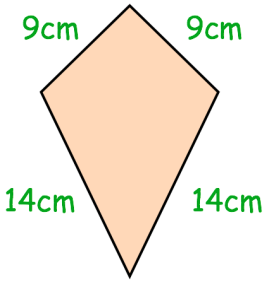
(d)



(e)

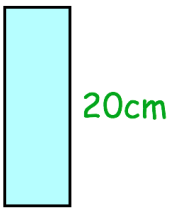


(f)

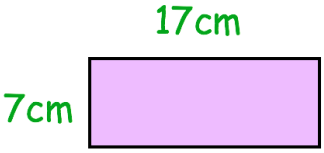


Question 2: Find the perimeter of each of these rectangles.

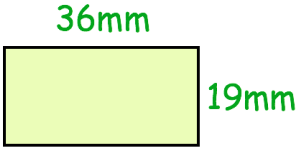
(a)



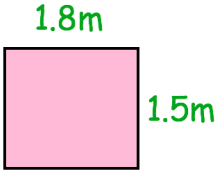
(b)



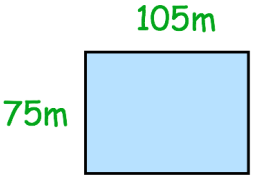
(c)



(d)



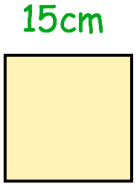
(e)



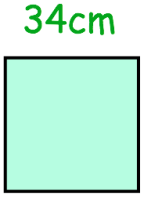
(f)

Question 3: Work out the perimeter of each of these squares

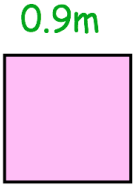
(a)



(b)



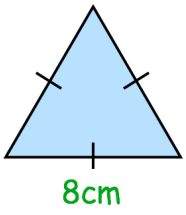
(c)



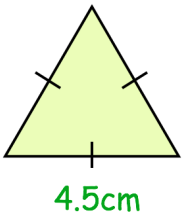
Fluency Practice

Question 4: Work out the perimeter of each of these equilateral triangles

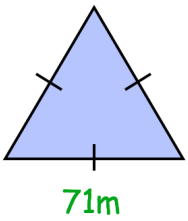
(a)



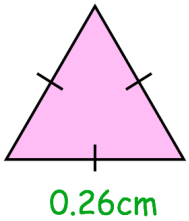
(b)



(c)

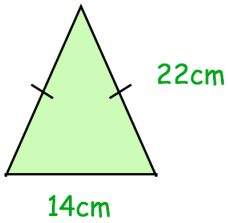


(d)

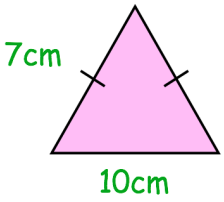


Question 5: Calculate the perimeter of each of these isosceles triangles

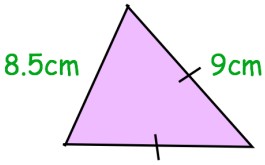
(a)



(b)

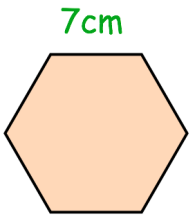


(c)

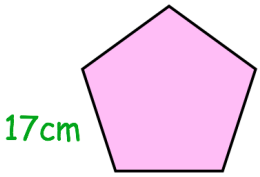


Question 6: Work out the perimeter of each of these regular shapes

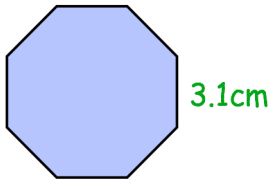
(a)



(b)

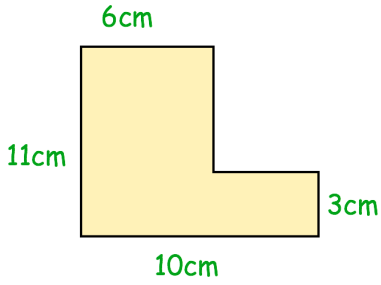


(c)

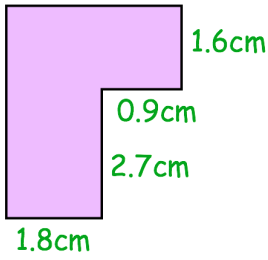


Question 7: Find the perimeter of each of these shapes

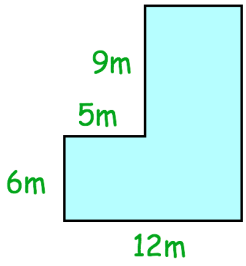
(a)



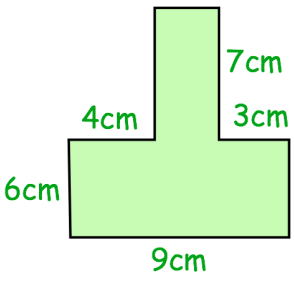
(b)



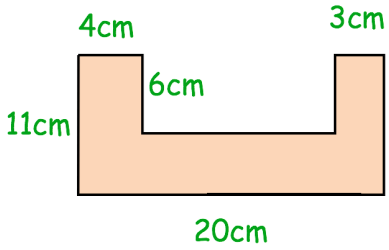
(c)



(d)

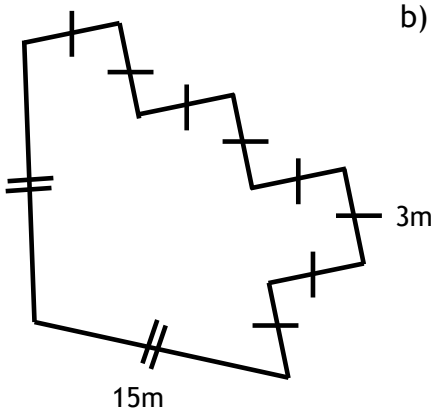


(e)

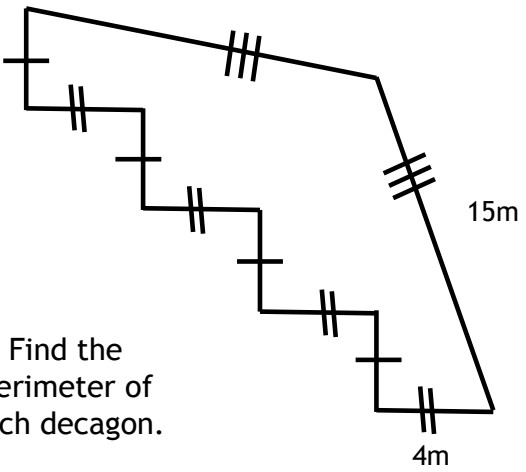


Extension

a)

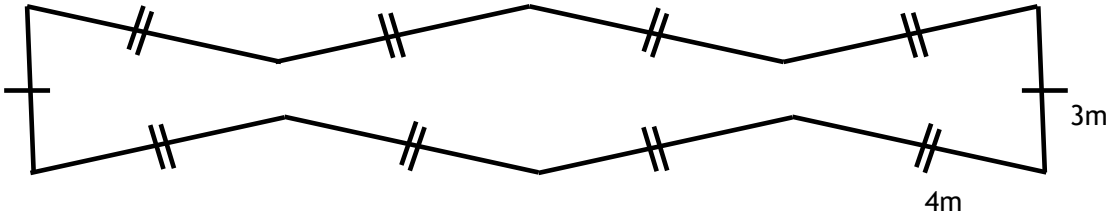


b)

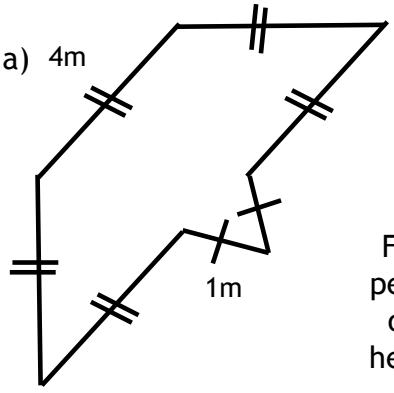


Find the perimeter of each decagon.

c)

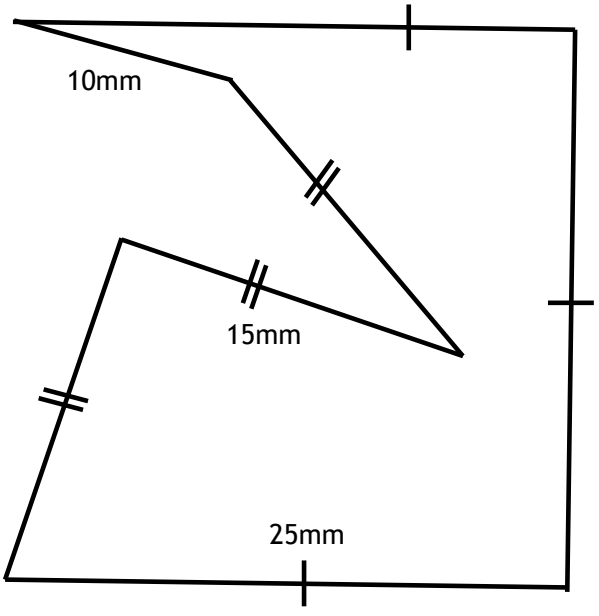


a)

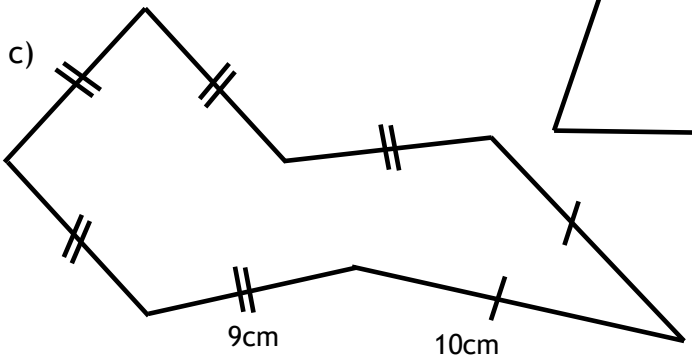


Find the perimeter of each heptagon.

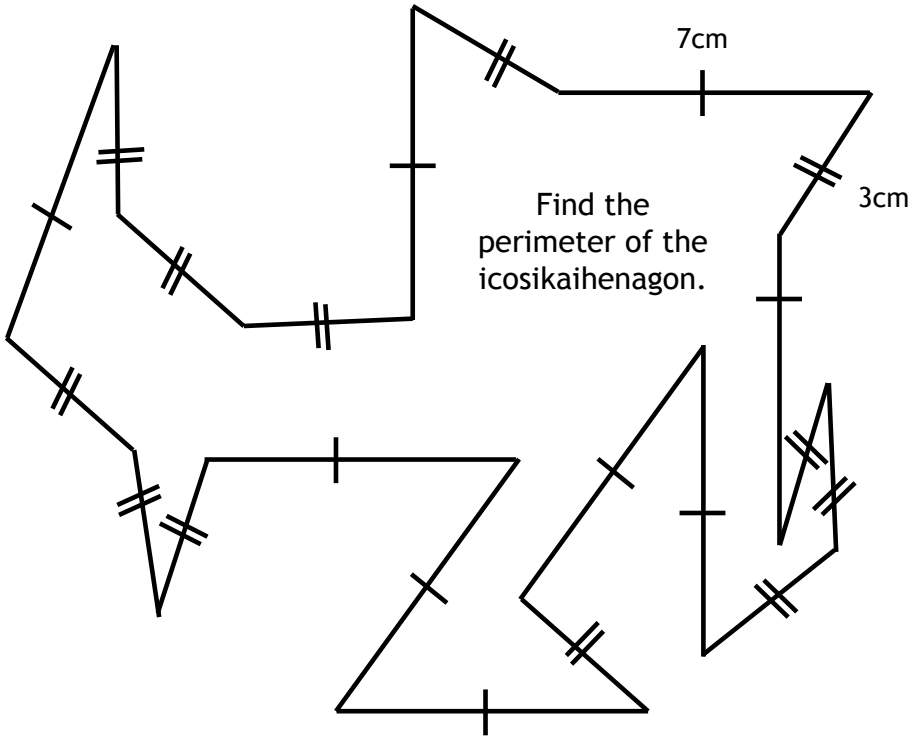
b)



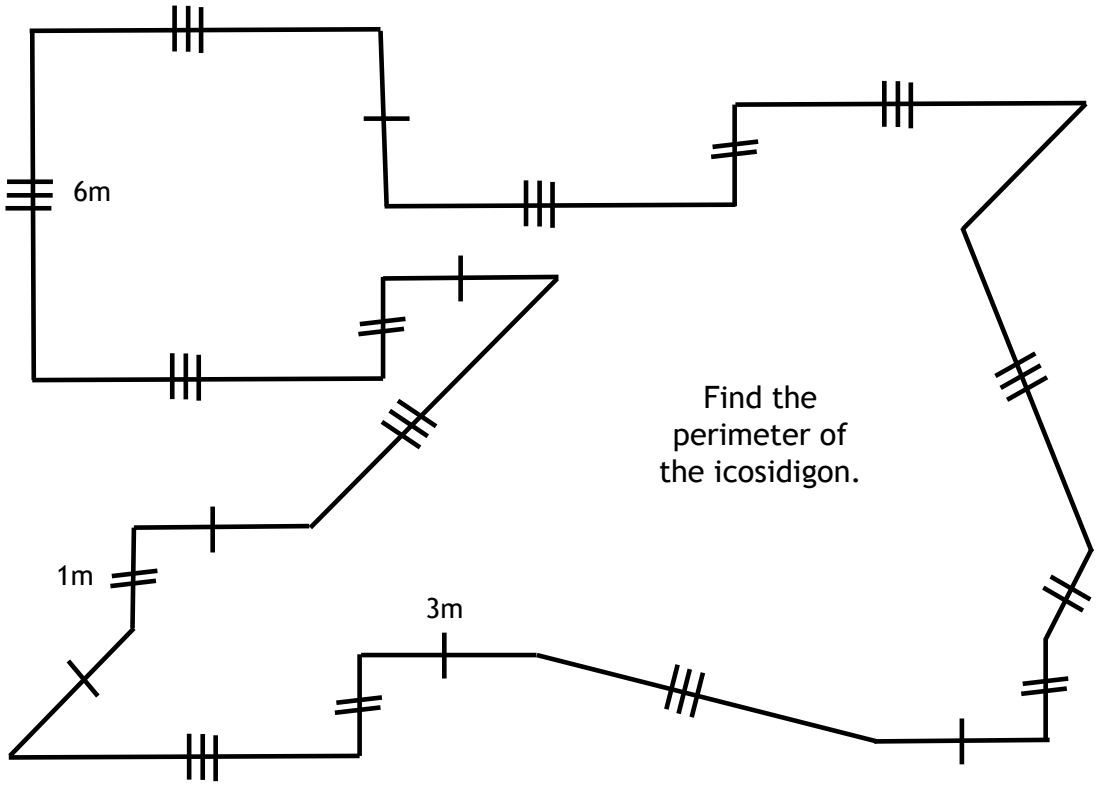
c)



Extension

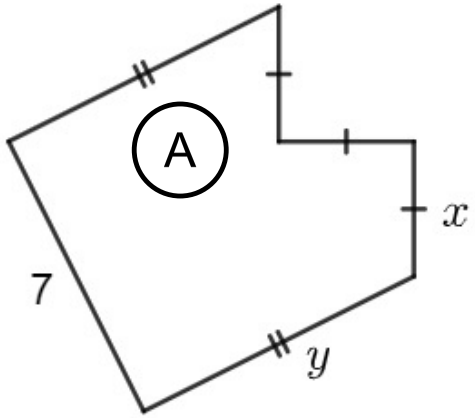


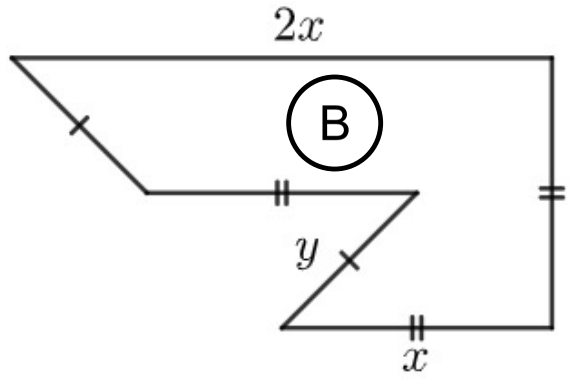
Find the perimeter of the icosikaihenagon.

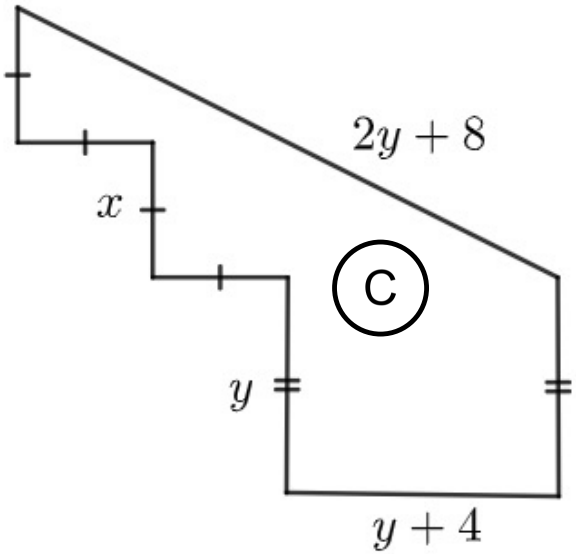


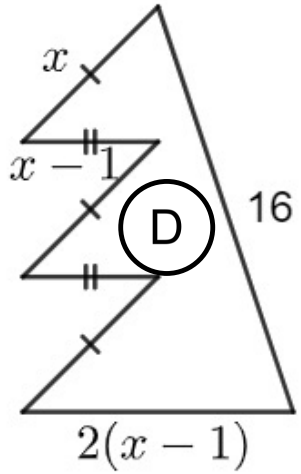
Find the perimeter of the icosidigon.

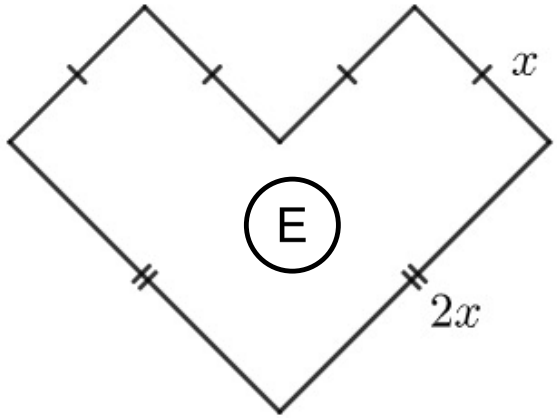
For each polygon, find an expression for the perimeter of the polygon.

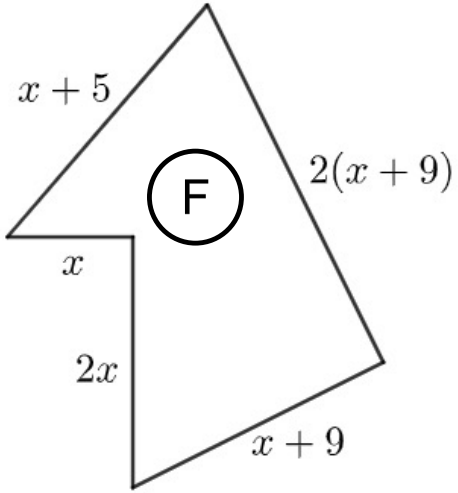










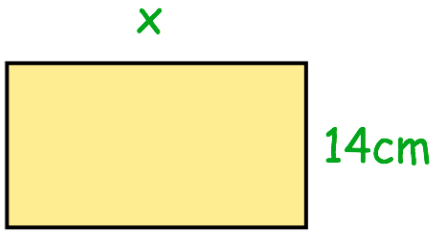


Question 8: The perimeter of each shape is given. Find the length of the missing side

(a)

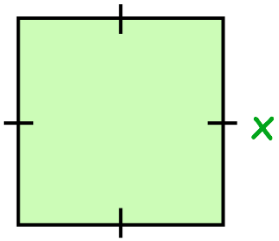
Perimeter = 26cm

(b)



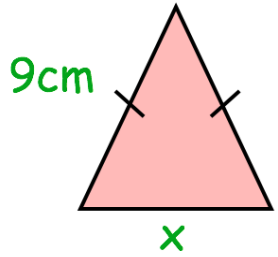
Perimeter = 80cm

(c)



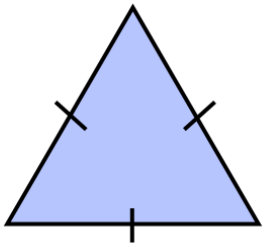
Perimeter = 20cm

(d)



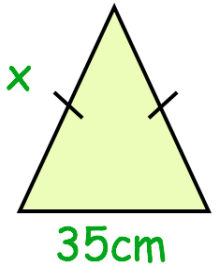
Perimeter = 25cm

(e)



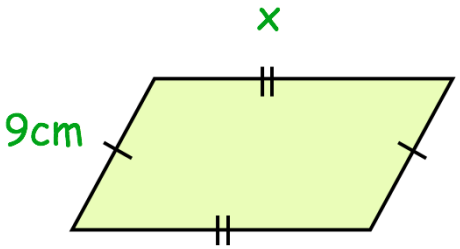
Perimeter = 36cm

(f)



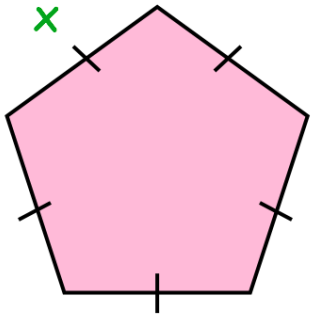
Perimeter = 79cm

(g)



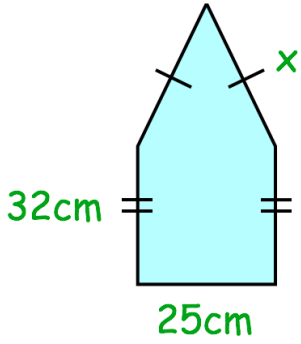
Perimeter = 45cm

(h)



Perimeter = 2m

(i)



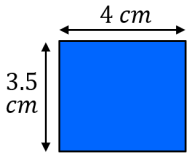
Perimeter = 163cm

Fluency Practice

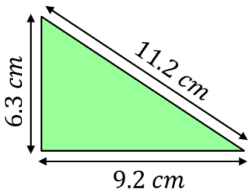
Fluency Practice

Find the perimeter of each of these 2D shapes.

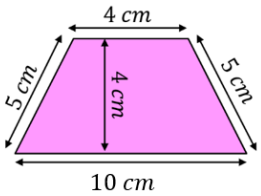
(a) *Rectangle*



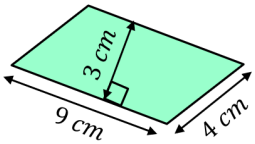
(b) *Triangle*



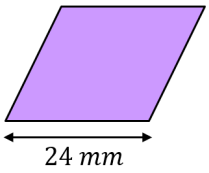
(c) *Trapezium*



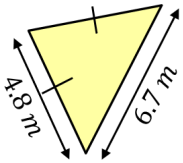
(d) *Parallelogram*



(e) *Rhombus*

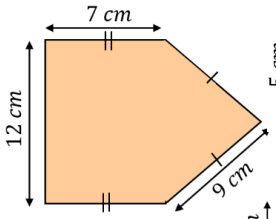


(f) *Triangle*

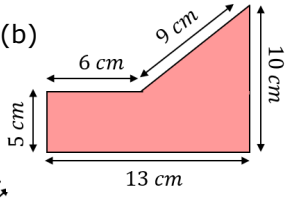


Find the perimeter of each of these 2D shapes.

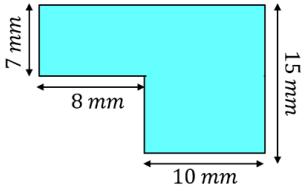
(a)



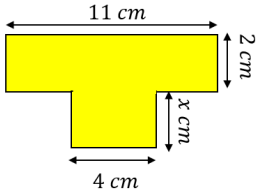
(b)



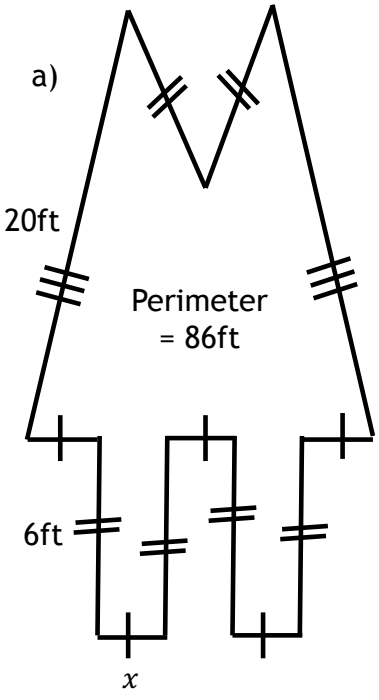
(c)

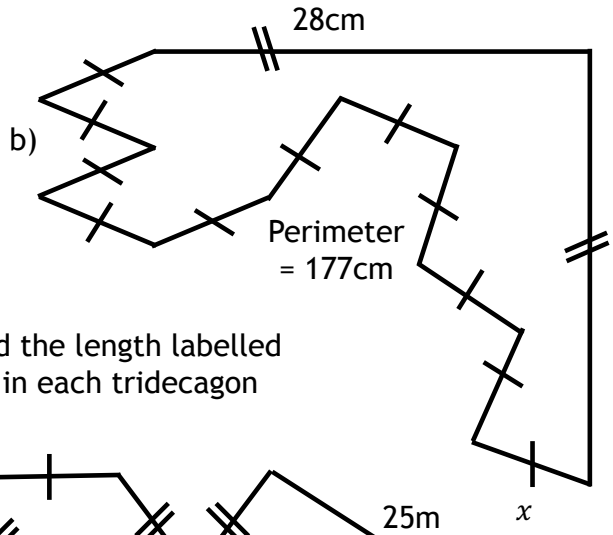


The perimeter of the shape is $31\ cm$. Find the missing length x.

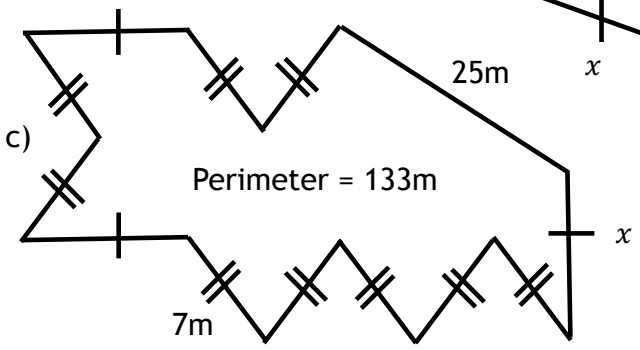


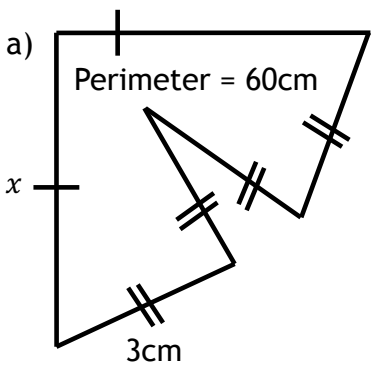
Extension

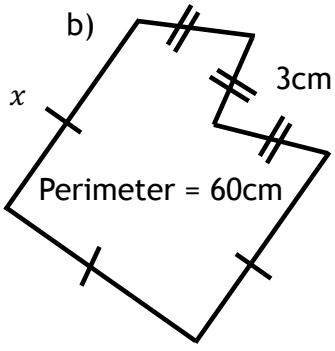




Find the length labelled x in each tridecagon





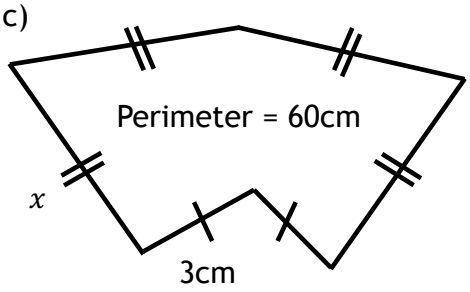


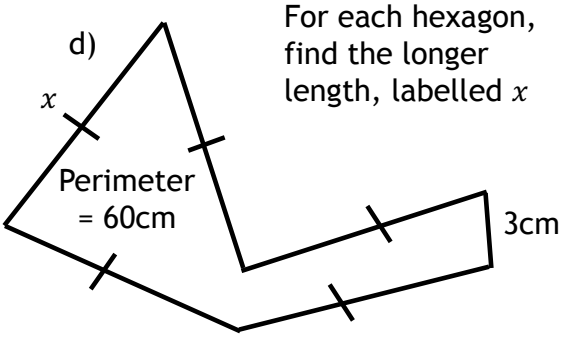
All four hexagons have a perimeter of 60cm

All four hexagons are made up of only two lengths

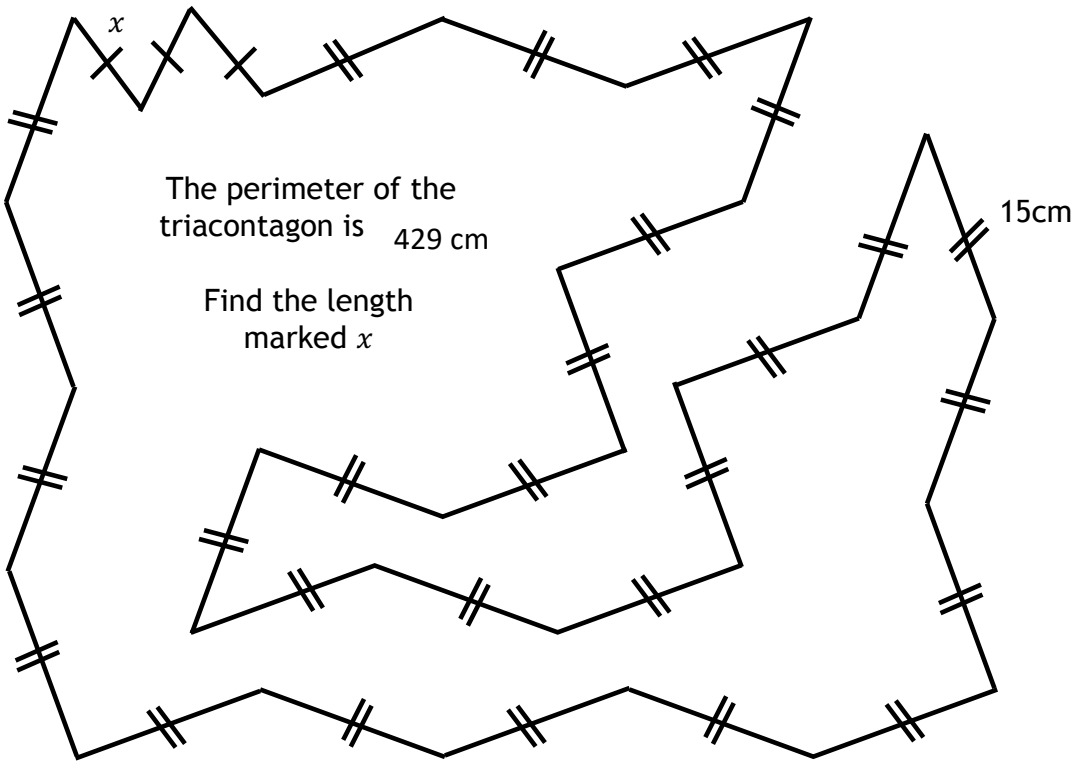
All four hexagons have a shorter length of 3cm

For each hexagon, find the longer length, labelled x



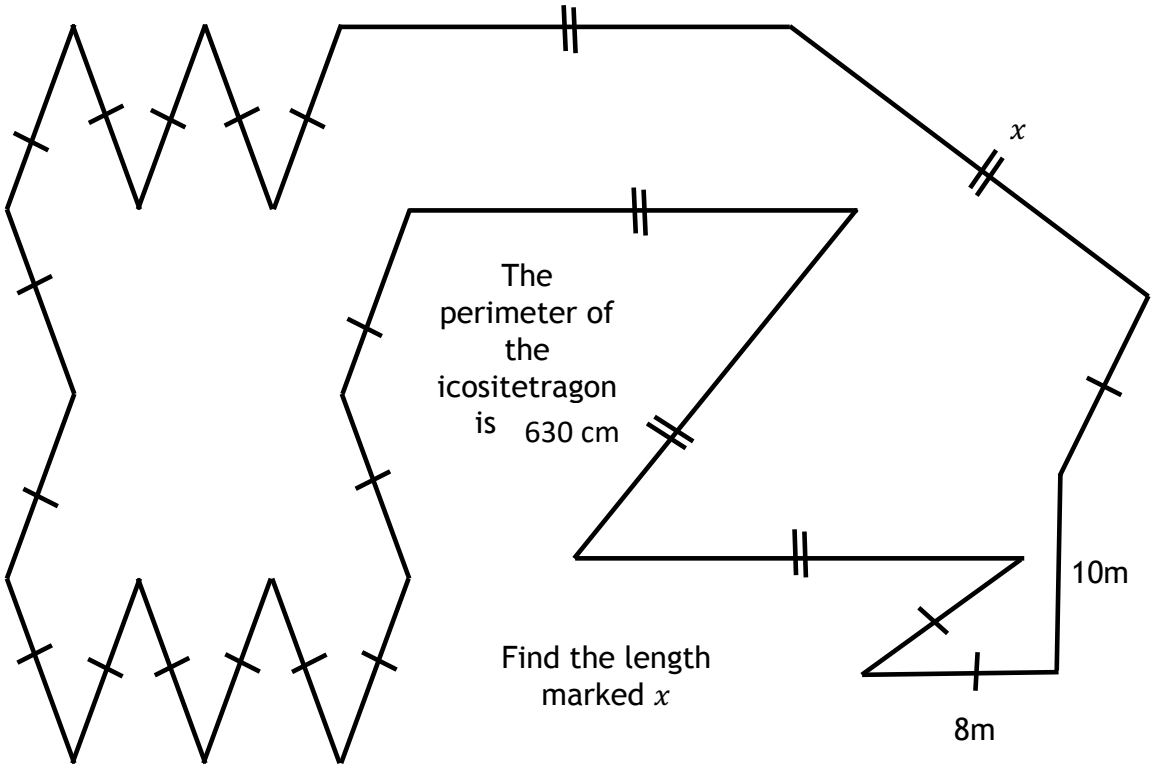


Extension



The perimeter of the triacontagon is 429 cm

Find the length marked x

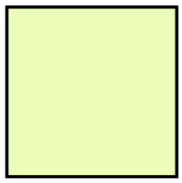


The perimeter of the icositetragon is 630 cm

Find the length marked x

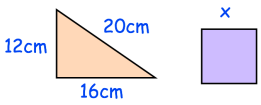
Extension

Question 1: The square is drawn accurately
Find the perimeter of the square.

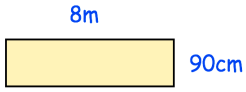


Question 2: A rectangle has a perimeter of 18cm.
Write down a possible pair of values for its length and width

Question 3: The triangle and square have the same perimeter.
Find x



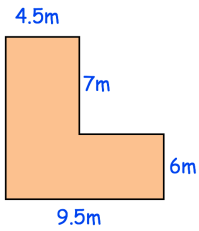
Question 4: Shown is a rectangle.
Work out the perimeter of the rectangle.



Question 5: The length of a rectangular field is 60m greater than the width of the field.
The field has a length of 310m.
Find the perimeter of the field.

Question 6: Felicity wants to place a wooden fence around her vegetable garden.
Each metre of fencing costs £5.80

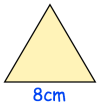
Work out the cost of the new fence

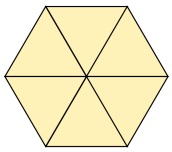


Question 7: Below is a coffee table.
The length of the table is 40cm more that the width of the table.
The perimeter of the table is 3.8m

Find the size of the length and width of the table

Question 8: Shown is an equilateral triangle with side length of 8cm.
Six of the triangles are put together to make a larger shape.
Find the perimeter of the larger shape.



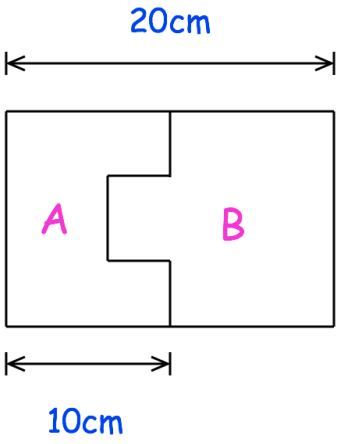


Question 9: A square has an area of $36cm^2$
Find the perimeter of the square.

Question 10: Andy says that all rectangles with an area of $24cm^2$ have the same perimeter
Show that Andy is wrong.

Extension

Question 11: A rectangle is divided into two shapes, A and B



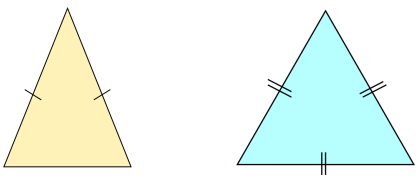
(a) Which of these statements is true?

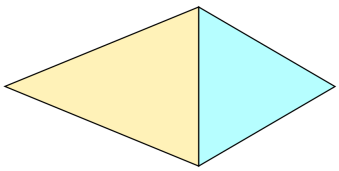
- The area of A is greater than the area of B
- The area of A is less than the area of B
- The area of A is the same as the area of B

(b) Which of these statements is true?

- The perimeter of A is greater than the perimeter of B
- The perimeter of A is less than the perimeter of B
- The perimeter of A is the same as the perimeter of B

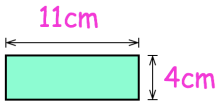
Question 12: An isosceles triangle has a perimeter of 73cm
An equilateral triangle has a perimeter of 51cm
The triangles are put together to make a kite.

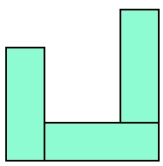




Work out the perimeter of the kite.

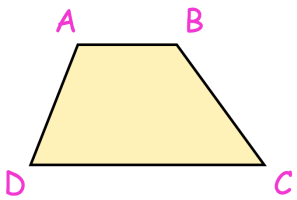
Question 13: Three congruent rectangles, are placed together to make the shape below.





Find the perimeter of the shape.

Question 14: ABCD is a trapezium
AD is twice the length of AB
BC is 3cm longer than AD
DC is 19cm longer than AB
The perimeter of the trapezium is 49cm



Find the length of AB

Fluency Practice

perimeter

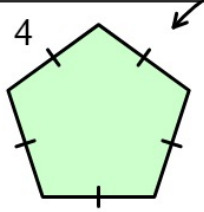
Diagrams not to scale.
All lengths are measured in cm.

learn by heart

Perimeter: *The distance around the edge of a shape*

example

Calculate the perimeter:



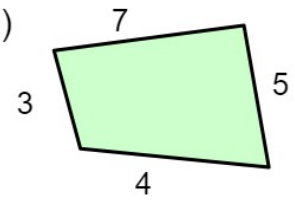
Equal lengths are marked with dashes

= 4 + 4 + 4 + 4 + 4
= 20

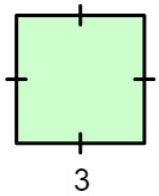
questions

1. Calculate the perimeter:

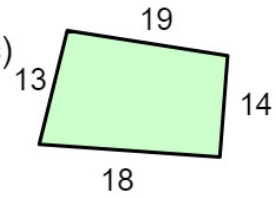
a)



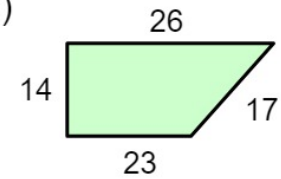
b)



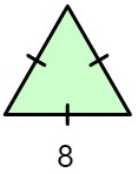
c)



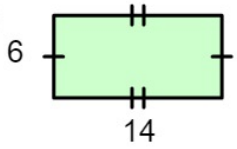
d)



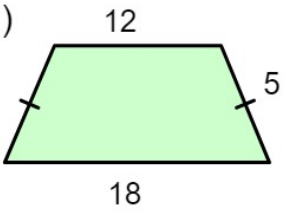
e)



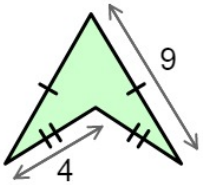
f)



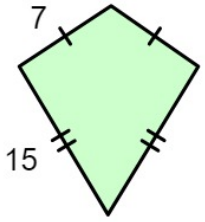
g)



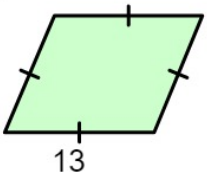
h)



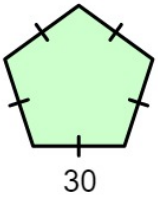
i)



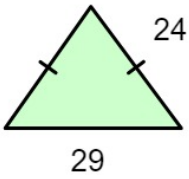
j)



k)



l)

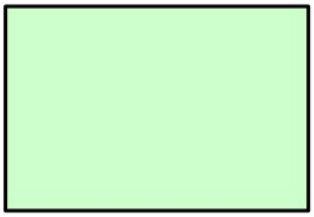


Fluency Practice

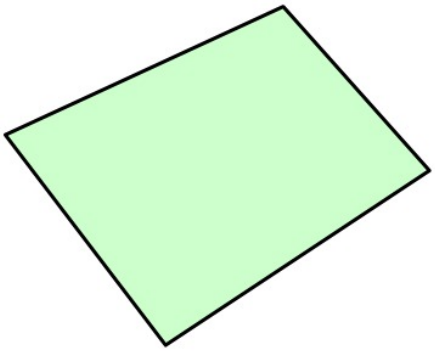
perimeter

2. Use a ruler to measure the perimeter of these shapes.
Give your answer in cm.

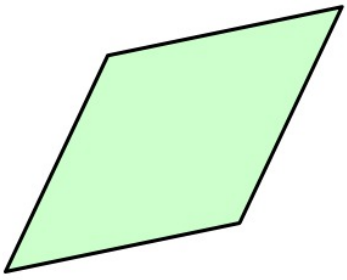
a)



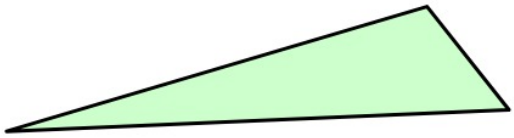
b)



c)



d)



3. Draw a shape with a perimeter of 20cm.

4. Draw a different shape with a perimeter of 20cm.

Fluency Practice

perimeter

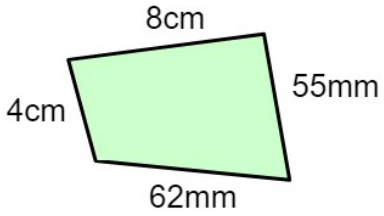
Diagrams not to scale

example

Calculate the perimeter of this shape:

= 8cm + 5.5cm + 6.2cm + 4cm

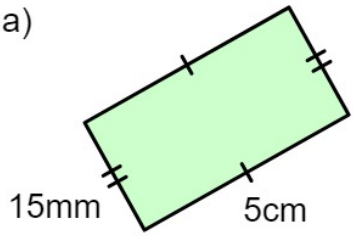
= 23.7cm



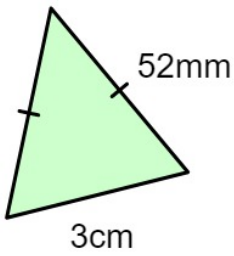
questions

5. These shapes are not drawn accurately. Calculate their perimeter. Give your answer in cm.

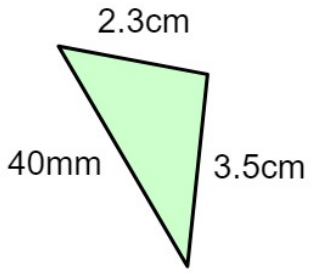
a)



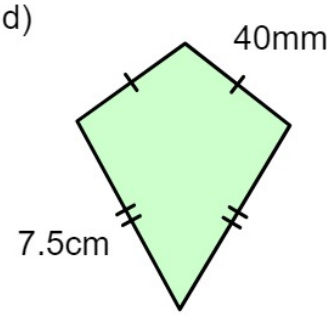
b)



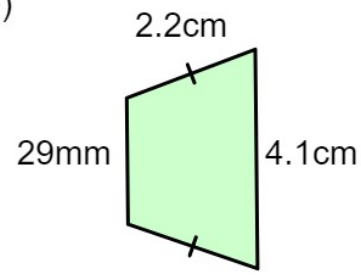
c)



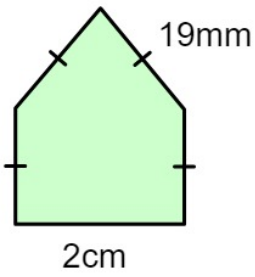
d)



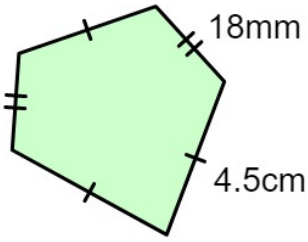
e)



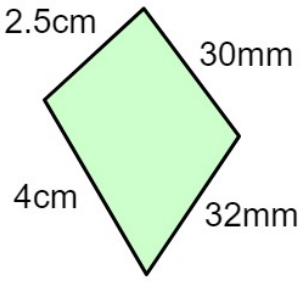
f)



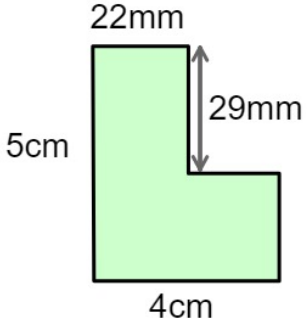
g)



h)



i)



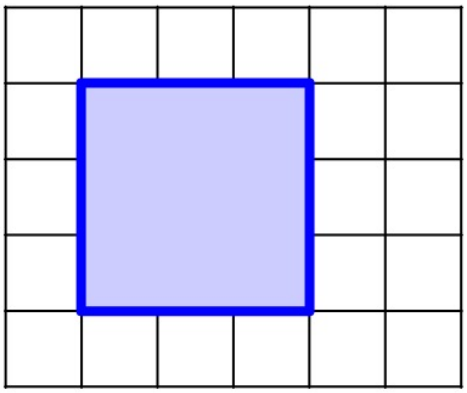
Fluency Practice

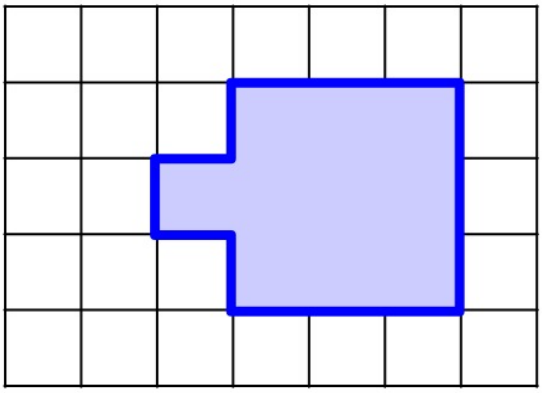
perimeter

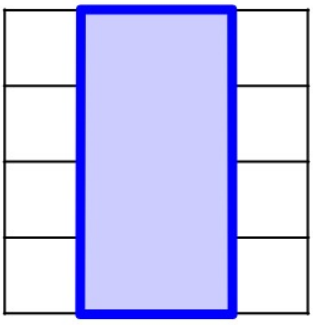
Diagrams not to scale

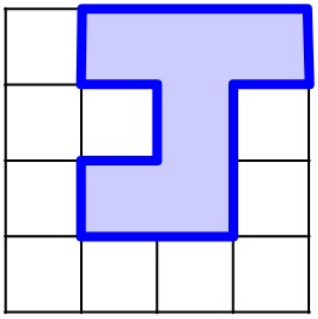
questions

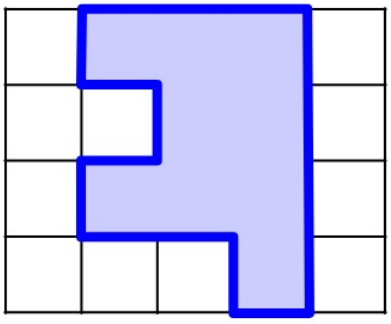
6. These diagrams are drawn on cm squared paper.
Work out their perimeters.



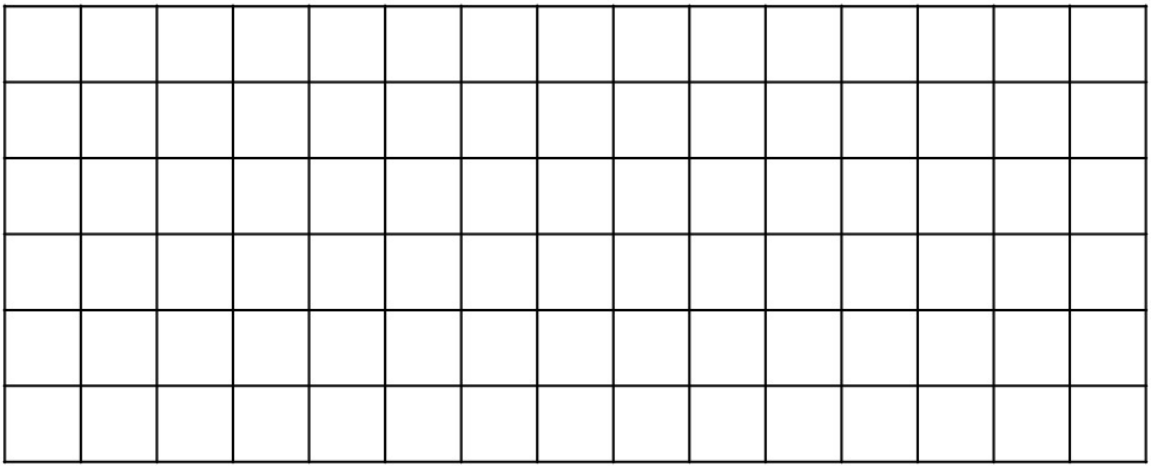






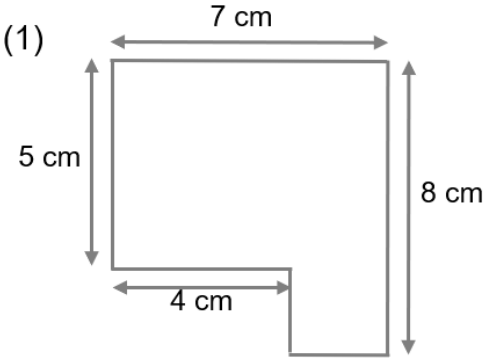


7. On the cm squared paper below, draw two different shapes each with a perimeter of 10cm

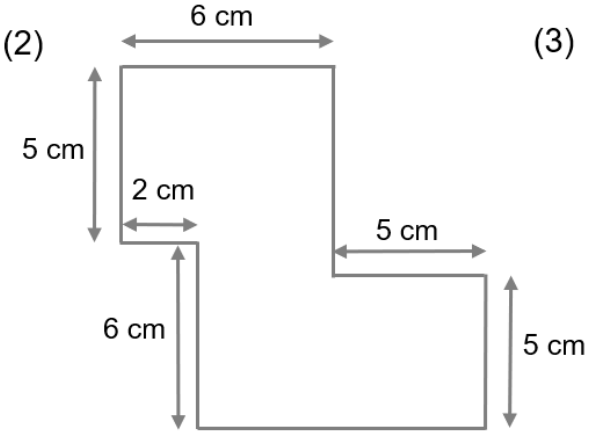


what are the overall perimeters of each shape?

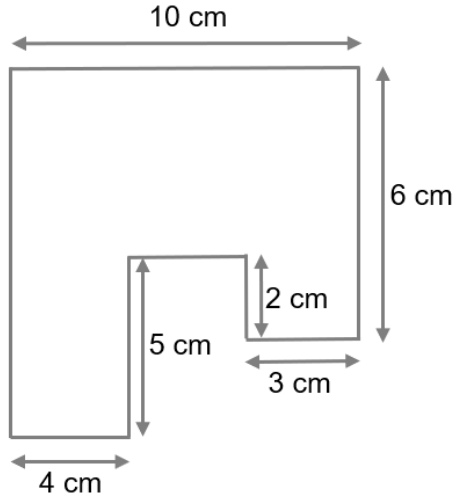
(1)



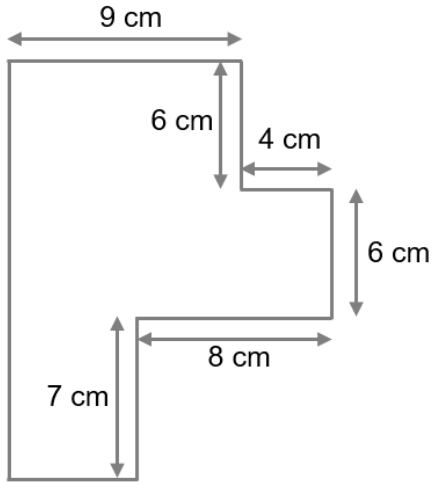
(2)



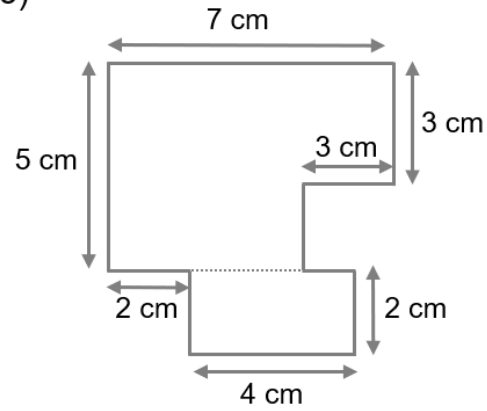
(3)



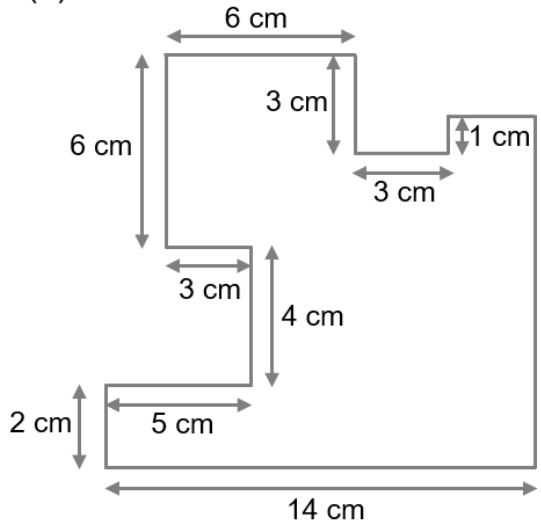
(4)



(5)



(6)

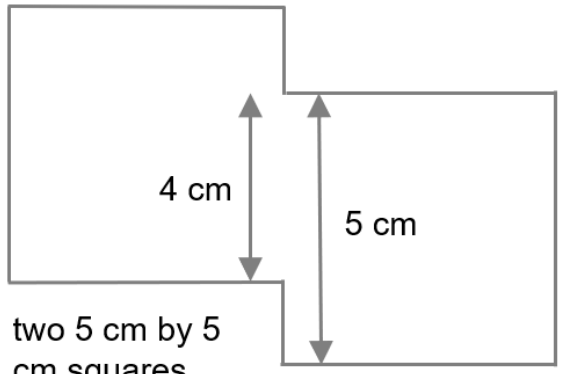


notes: the diagrams are not drawn accurately and the angles between lines are right angles

Extension

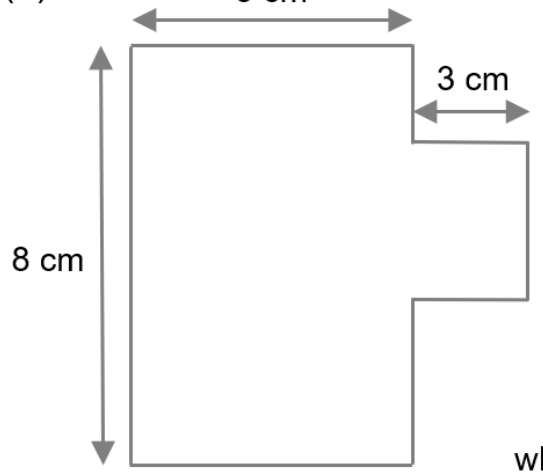
what are the overall perimeters of each shape?

(1)

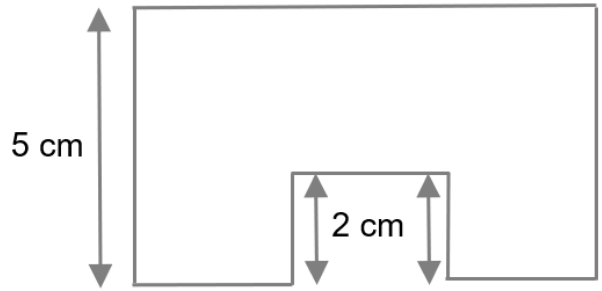


two 5 cm by 5 cm squares overlap

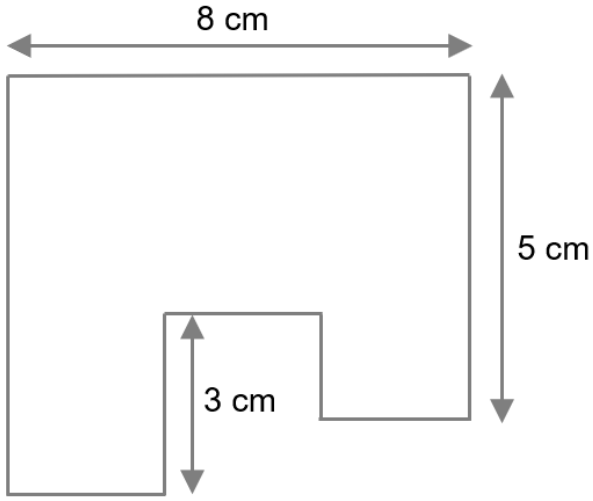
(2)



(3)



(4)

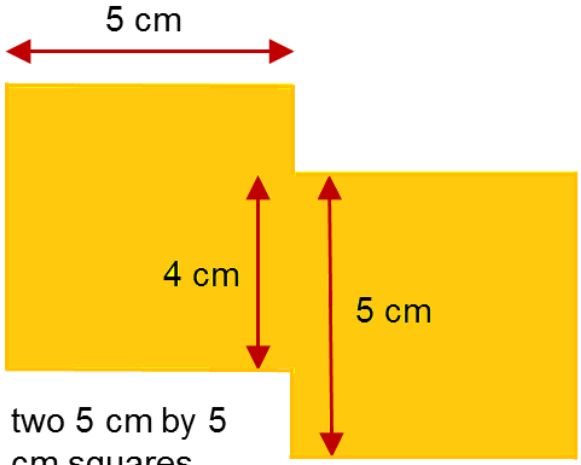


which shape has the largest perimeter?

Extension

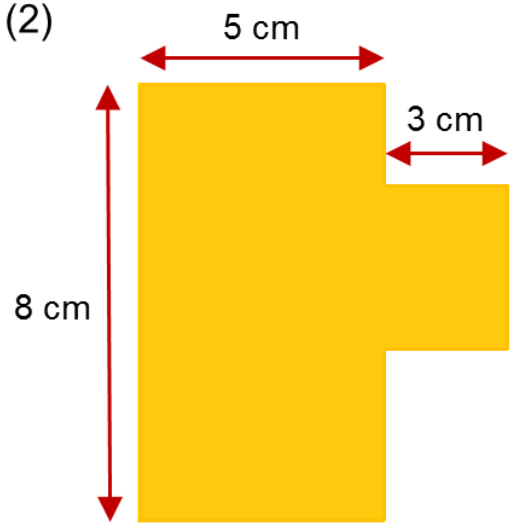
what are the perimeters of the overall shapes?

(1)

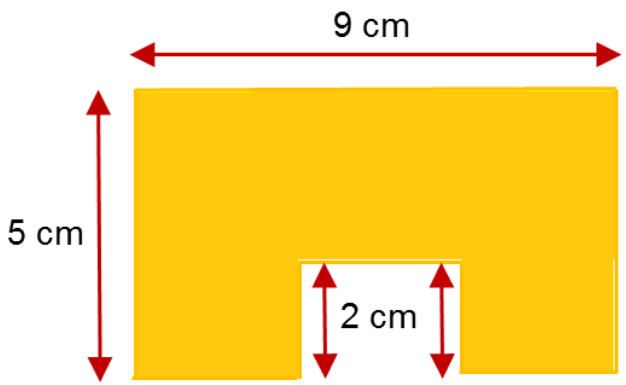


two 5 cm by 5 cm squares overlap

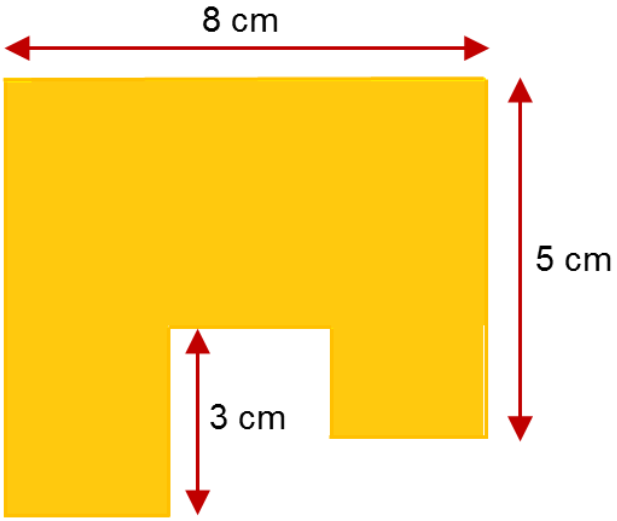
(2)



(3)



(4)

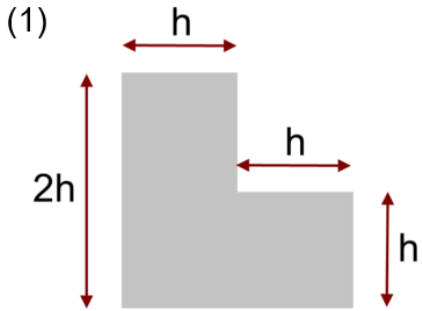


which overall shape has the largest perimeter?

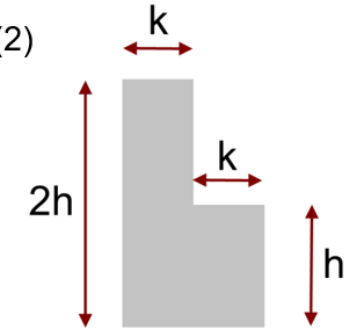
establish that the perimeter is 32 cm

try to write the perimeters of these shapes as an expression

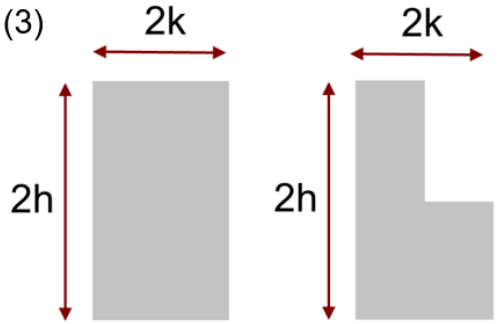
(1)



(2)

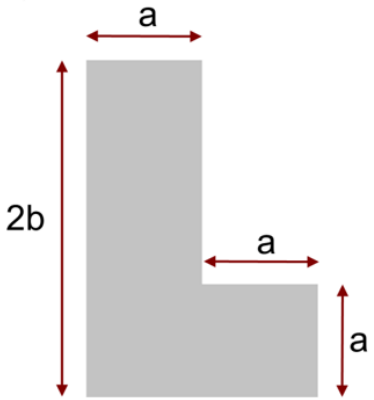


(3)

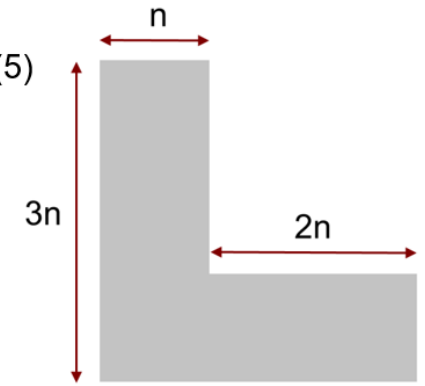


what happens to the perimeter when you take a bite out of it?

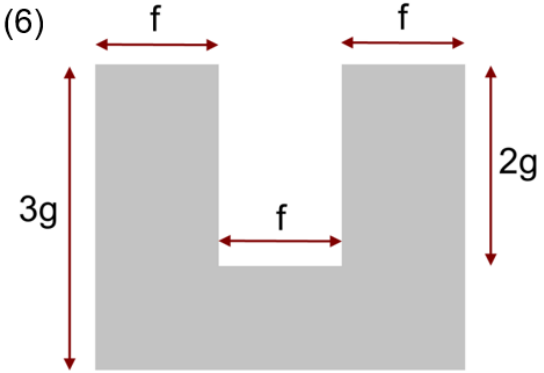
(4)



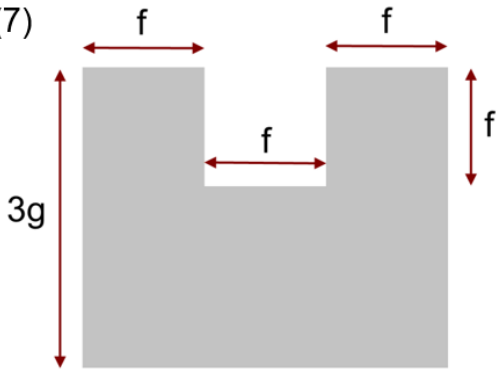
(5)



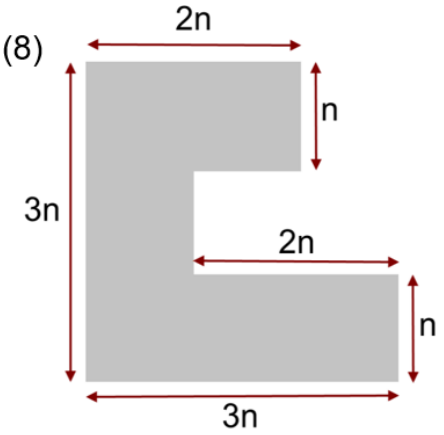
(6)



(7)



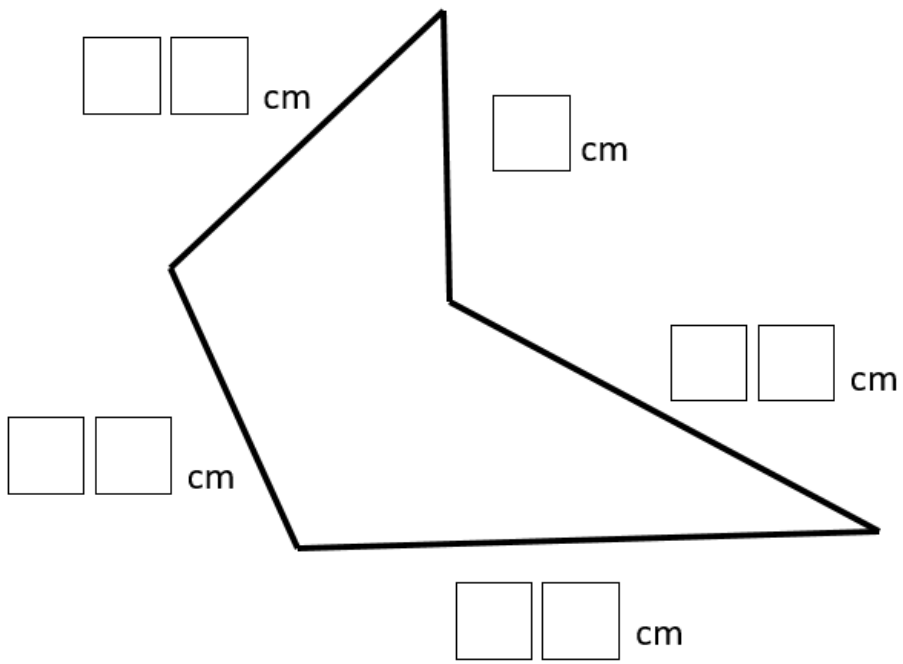
(8)



More-Same-Less

Perimeter

Value of A	Less	Same	More
More	$a =$ $Perimeter =$	$a = 5cm$ $Perimeter =$	$a =$ $Perimeter =$
Same	$a =$ $Perimeter =$	$a = 5cm$ $Perimeter =$	$a =$ $Perimeter =$
Less	$a =$ $Perimeter =$	$a = 5cm$ $Perimeter =$	$a =$ $Perimeter =$



Place the digits 1 – 9 , once each, into the boxes.

Round the lengths to the nearest 10.

What is the largest perimeter you can make?

What is the smallest perimeter you can make?

Extra thinking…

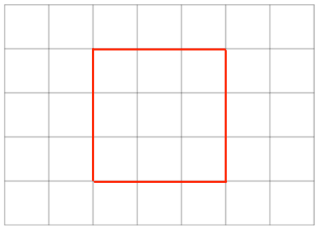
Are we able to create impossible polygons?

How do we know that they are impossible?

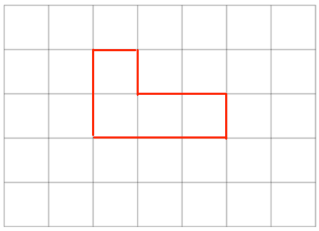
Fluency Practice

Question 1: The following shapes are drawn on centimetre-squared paper.
Find the area of each shape.

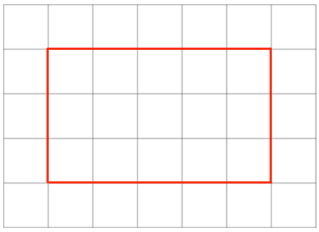
(a)



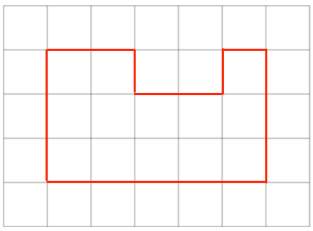
(b)



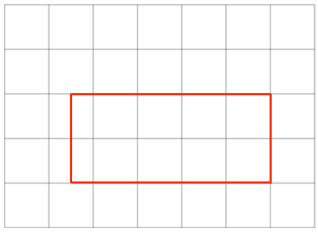
(c)



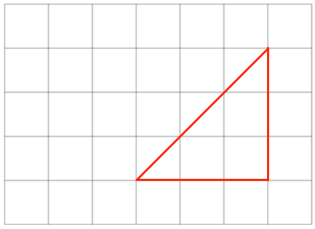
(d)



(e)

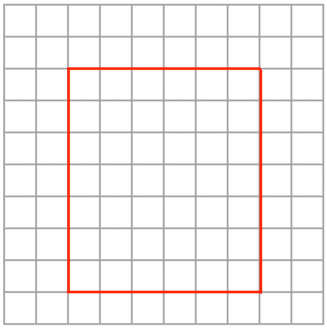


(f)

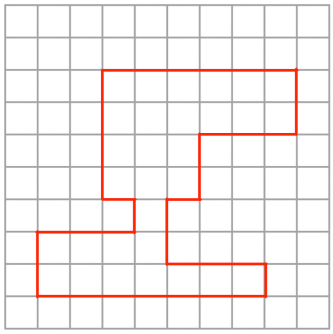


Question 2: The following shapes are drawn on centimetre-squared paper.
Find the area of each shape.

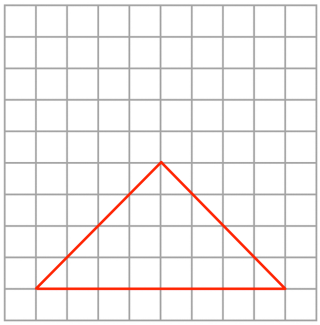
(a)



(b)

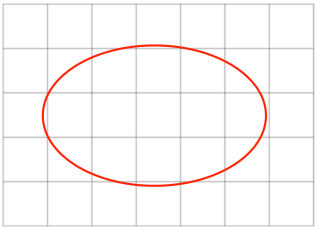


(c)

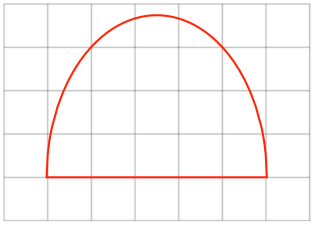


Question 3: The following shapes are drawn on centimetre-squared paper.
Estimate their areas.

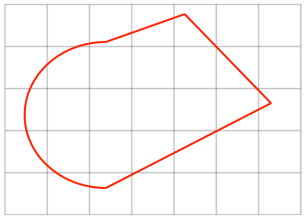
(a)



(b)



(c)



Extension

Question 1: On centimetre-square paper, draw a rectangle with an area of $10cm^2$

Question 2: On centimetre-square paper, draw three different rectangles with an area of $12cm^2$

Question 3: A square has an area of $25cm^2$.
(a) Draw this square on centimetre-square paper.
(b) Find the perimeter of the square.

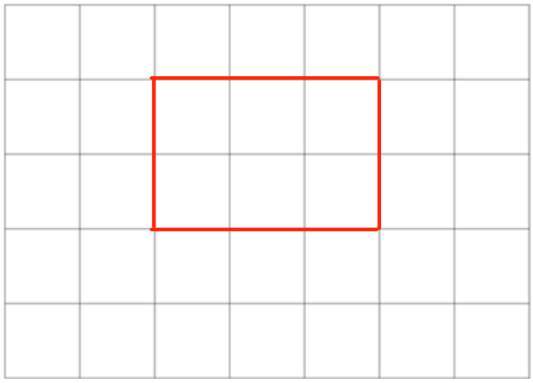
Question 4: A rectangle has an area of $30cm^2$.
(a) Draw two possible rectangles on centimetre-square paper.
(b) Find the perimeter of both rectangles.

Question 5: A square has a perimeter of 12cm
(a) Draw this square on centimetre-square paper.
(b) Find the area of the square.

Question 6: Draw a shape that has one line of symmetry and an area of $8cm^2$

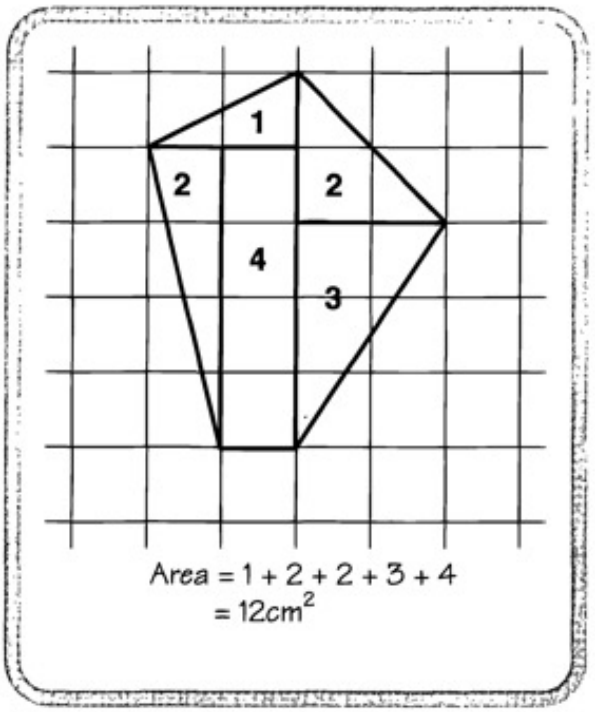
Question 7: Draw a shape that has two lines of symmetry and an area of $10cm^2$

Question 8: Jasmine says the area of this shape is 10cm.
Explain her mistake.

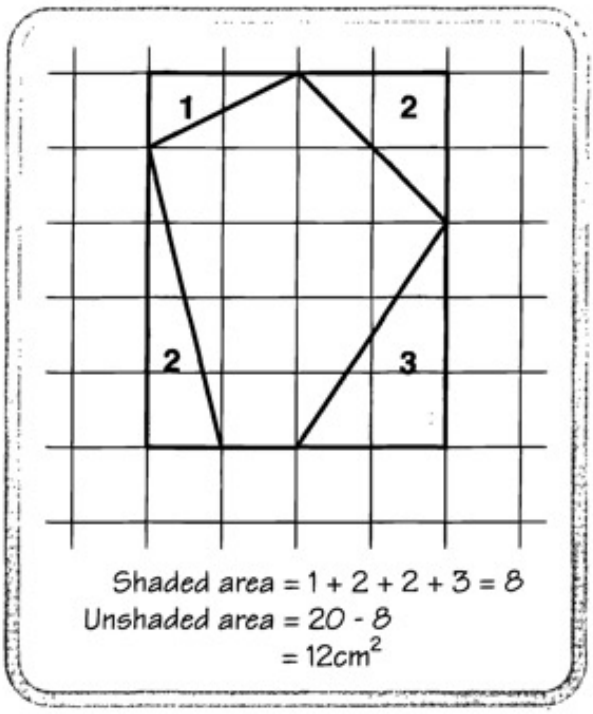


Extension

Here are two methods for finding the area of a polygon.



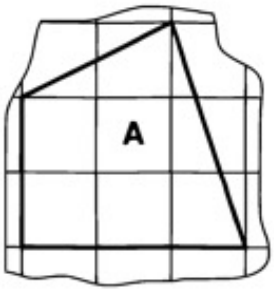
Area = 1 + 2 + 2 + 3 + 4
= 12cm^2

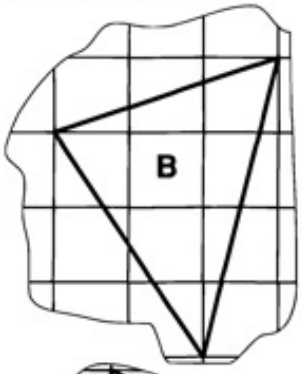


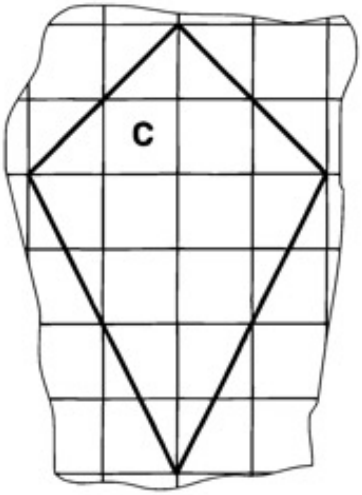
Shaded area = 1 + 2 + 2 + 3 = 8
Unshaded area = 20 - 8
= 12cm^2

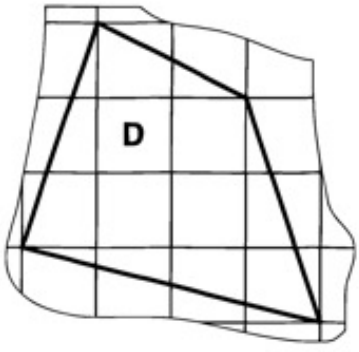
- Copy these shapes on to squared paper.

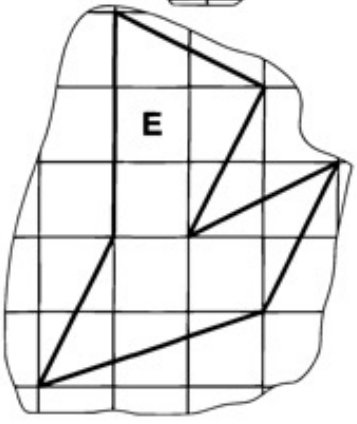
Choose one of the methods or your own to find the areas of these shapes.

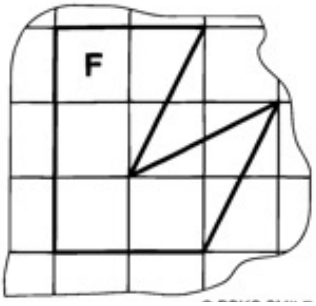








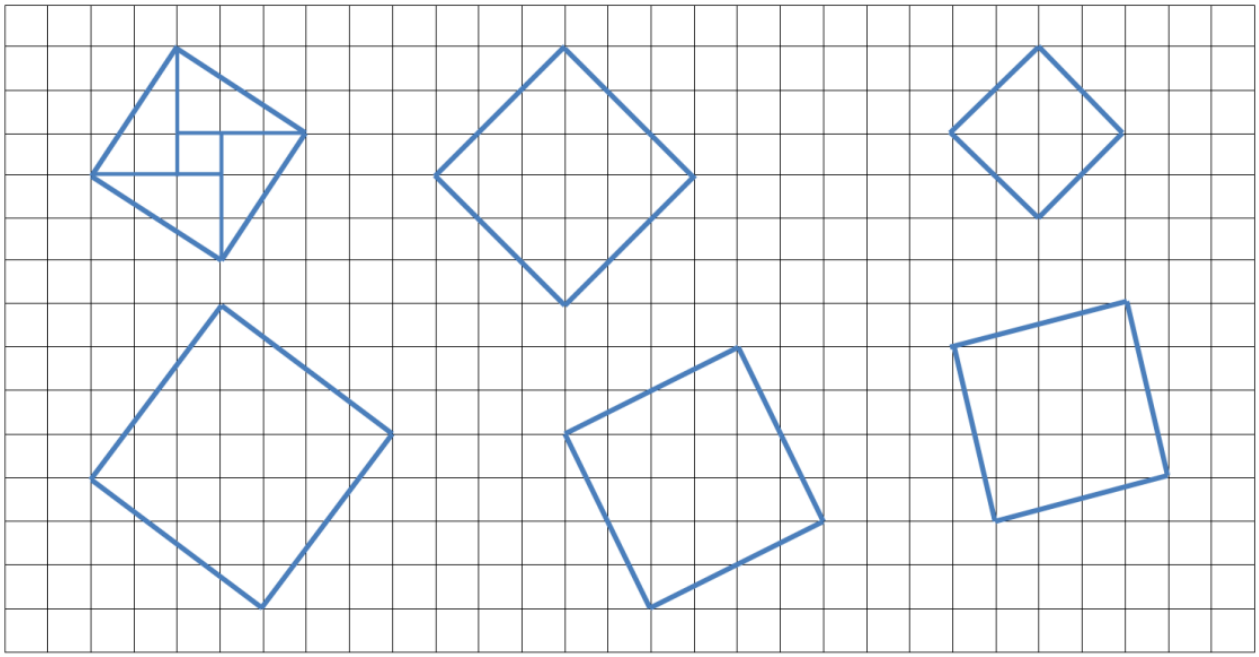




Fluency Practice

Can you work out the area of these squares? Break them into rectangles and triangles to help.

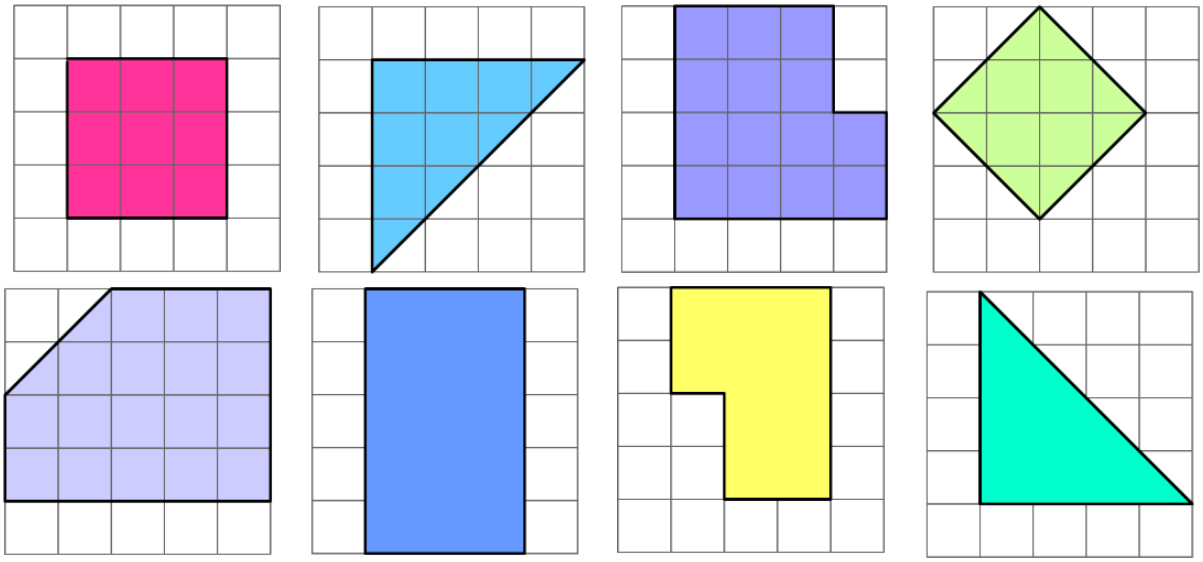
Once you know the area, can you work out the exact edge length of each square?



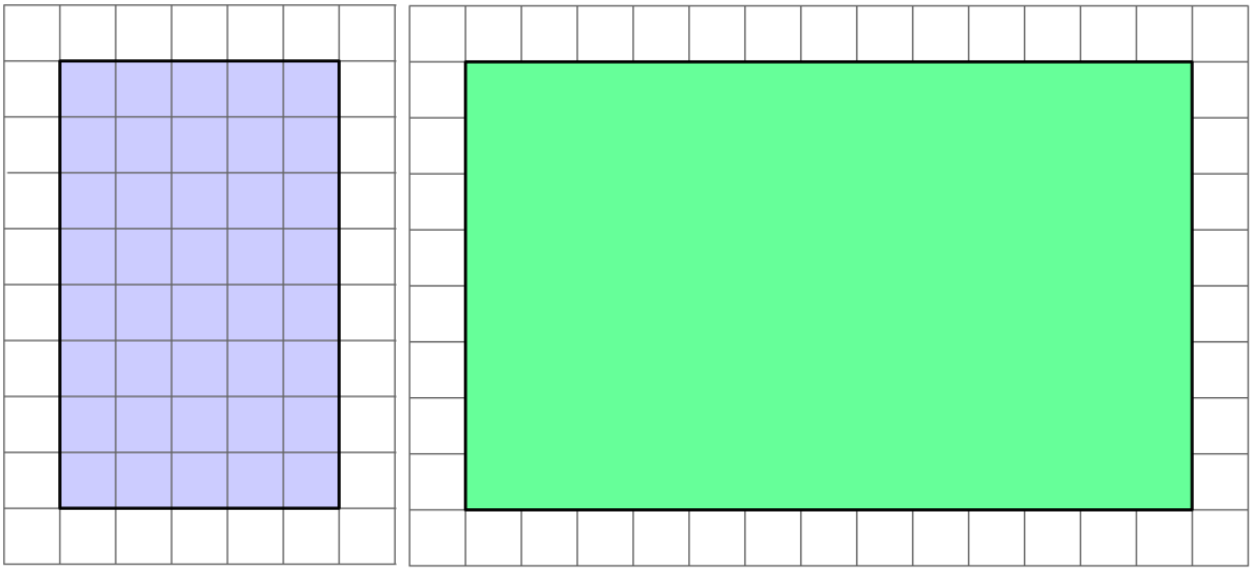
Can you draw a square with an area of 10cm^2? What about area 2cm^2? 3cm^2?
Which areas can form a square and which areas cannot? Try out your ideas here:

Fluency Practice

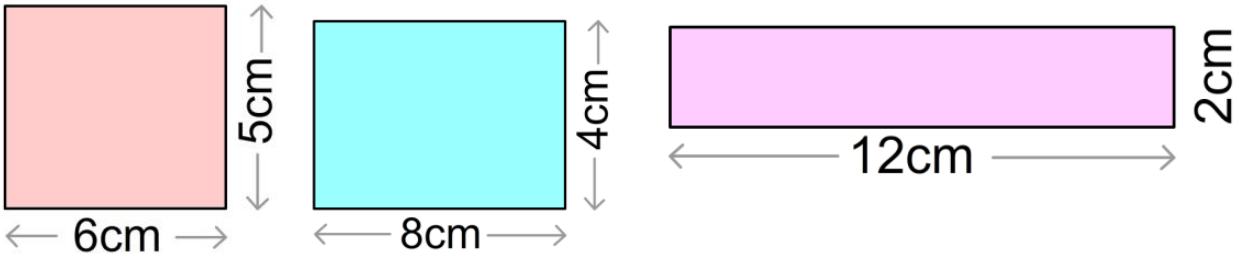
How many squares do each of these shapes cover?



These shapes are huge. What would be a quick way of counting the squares inside them?



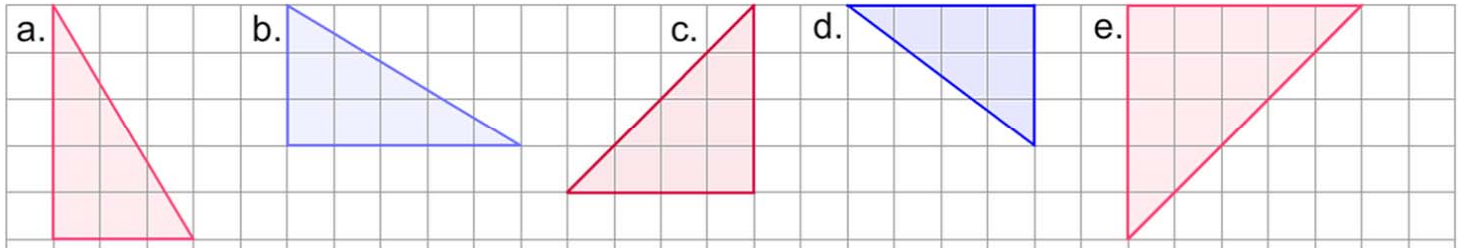
These shapes are drawn on plain paper. They are not drawn accurately. Look at the side lengths—how many 1cm by 1cm squares would fit inside each shape?



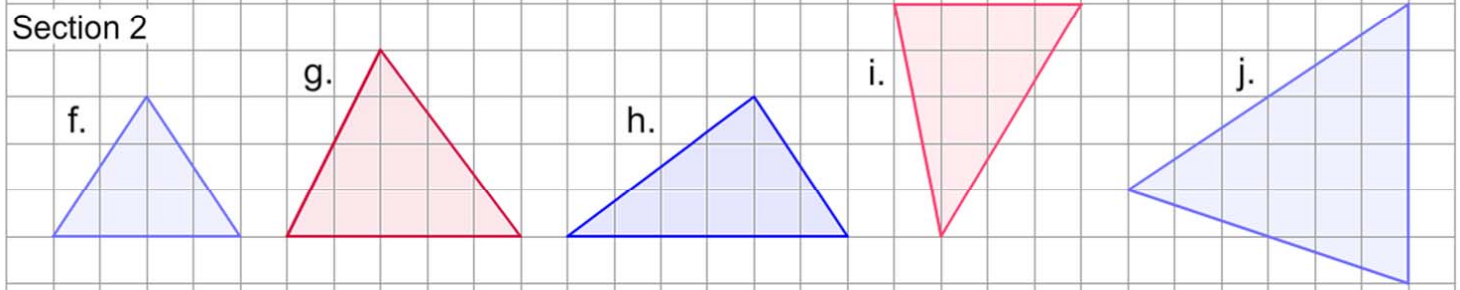
area of triangles

Calculate the area of these triangles, which are drawn on cm^2 paper.
As you work, try to find a quick method of calculating the areas.
The answers are mixed up at the edge for you to check against.

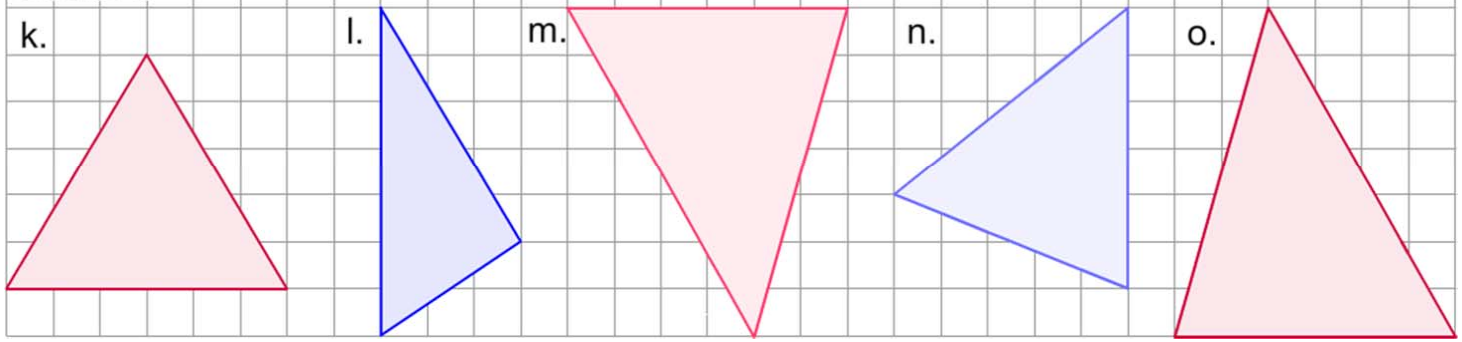
Section 1



Section 2



Section 3



Jumbled up answers

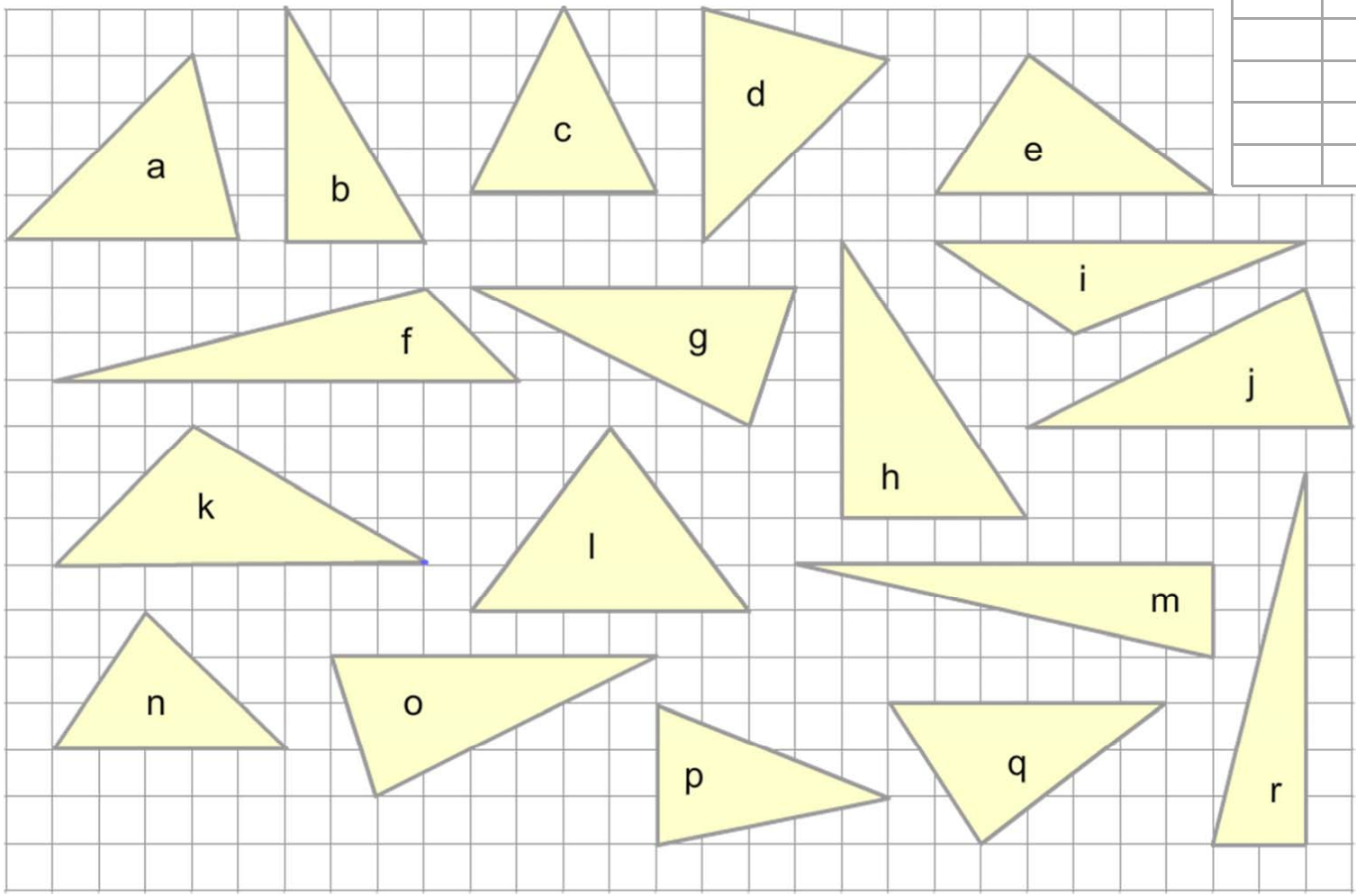
$12.5cm^2$
$9cm^2$
$10cm^2$
$10cm^2$
$15cm^2$
$10.5cm^2$
$7.5cm^2$
$7.5cm^2$
$18cm^2$
$6cm^2$
$21cm^2$
$21cm^2$
$6cm^2$
$8cm^2$
$15cm^2$

Fluency Practice

match three!

Work out the areas of these triangles.
Then match them into groups of three triangles with the same area.

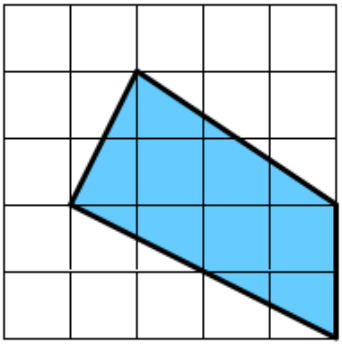
Record your groups here:



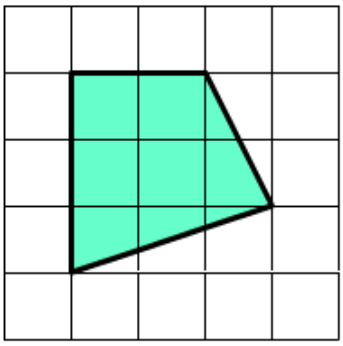
Purposeful Practice

Fluency Practice

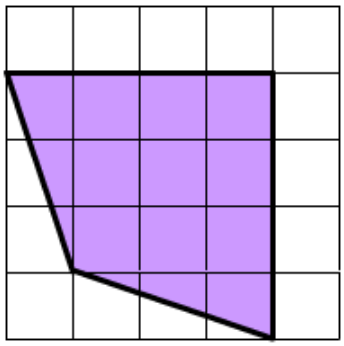
Split these shapes into smaller ones to help you calculate their areas exactly.

1. 

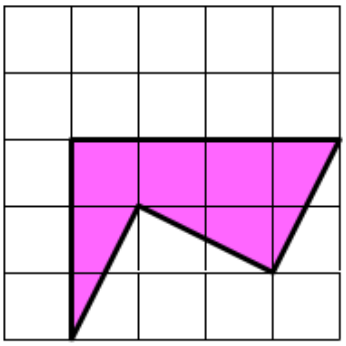
Area = ……..squares

2. 

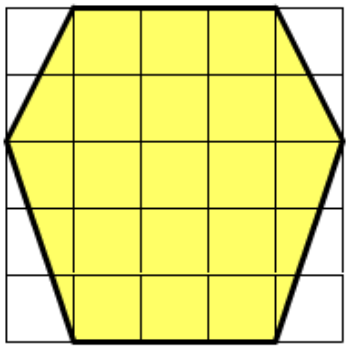
Area = ……..squares

3. 

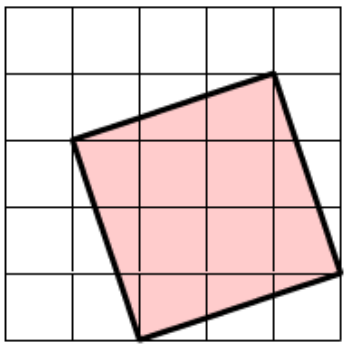
Area = ……..squares

4. 

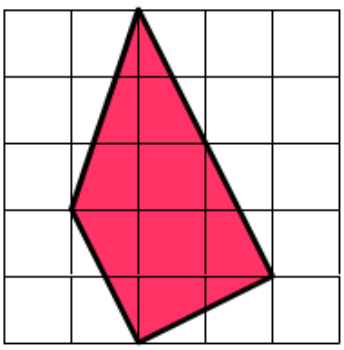
Area =……..squares

5. 

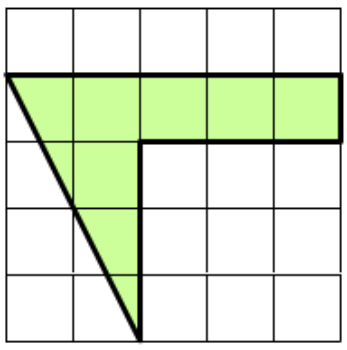
Area = ……..squares

6. 

Area = ……..squares

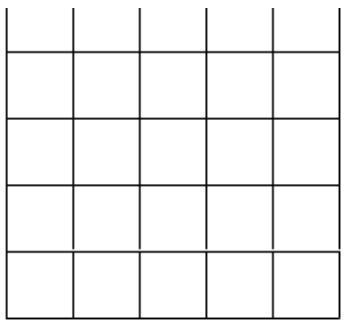
7. 

Area = ……..squares

8. 

Area = ……..squares

9. Draw the last answer:



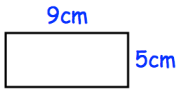
Area = ……..squares

Jumbled Answers: **7** **10** **8** **20** **7.5** **15** **6.5** **6** **12**

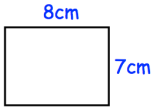
Fluency Practice

Question 1: Calculate the area of each of these rectangles

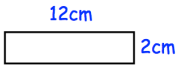
(a)



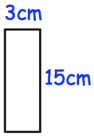
(b)



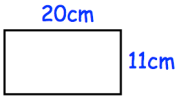
(c)



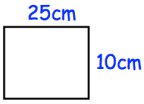
(d)



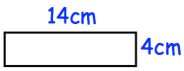
(e)



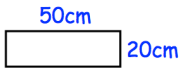
(f)



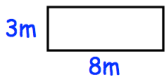
(g)



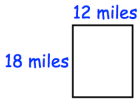
(h)



(i)



(j)

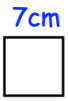


(k)

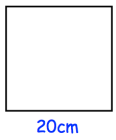
(l)

Question 2: Work out the area of each of these squares

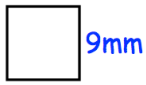
(a)



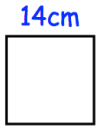
(b)



(c)

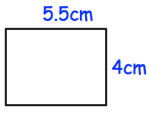


(d)

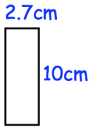


Question 3: Work out the area of each of these rectangles

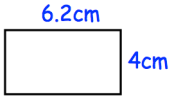
(a)



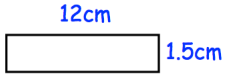
(b)



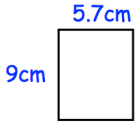
(c)



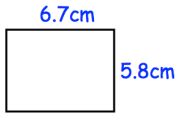
(d)



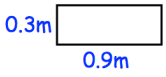
(e)



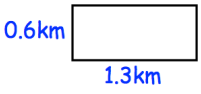
(f)



(g)

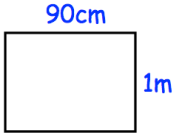


(h)

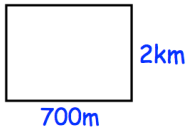


Question 4: Work out the area of each of these rectangles.
State your units for each answer.

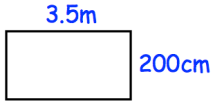
(a)



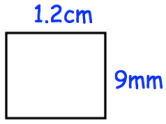
(b)



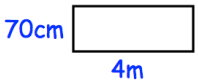
(c)



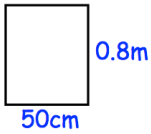
(d)



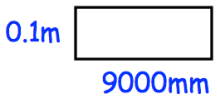
(e)



(f)



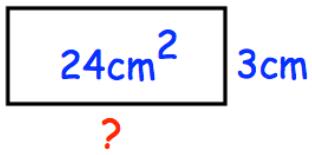
(g)



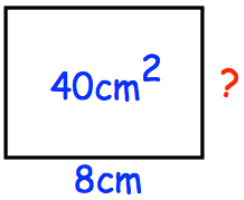
Fluency Practice

Question 5: The area of each of these rectangles have been given.
Find the length of the missing sides.

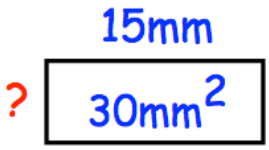
(a)



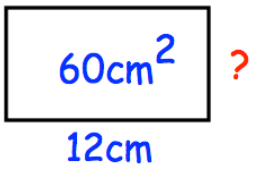
(b)



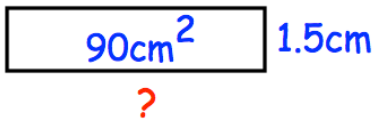
(c)



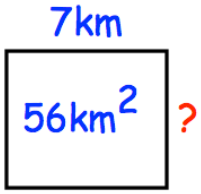
(d)



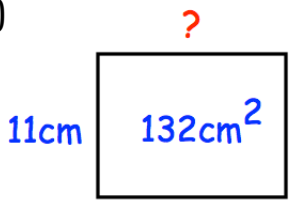
(e)



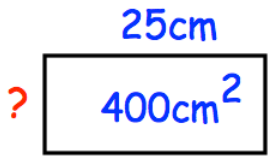
(f)



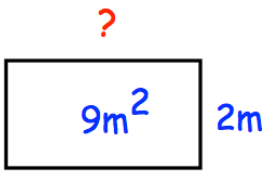
(g)



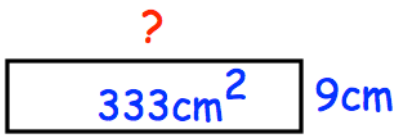
(h)



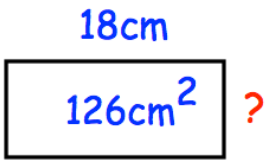
(i)



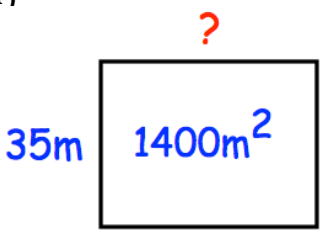
(j)



(k)



(l)



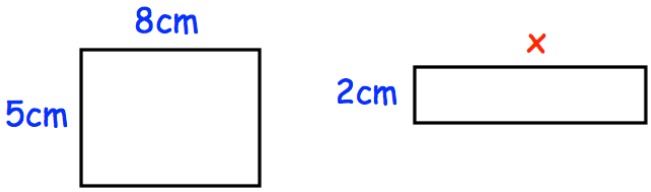
Extension

Question 1: A farmer has a field that is 300m long and 70m wide.
Calculate the area of the field.

Question 2: A piece of paper has a length of 18cm and a width of 6cm.
Find the area of paper.

Question 3: A rectangle has an area of $30cm^2$
Write down the length and width of **three** rectangles with an area of $30cm^2$

Question 4: These two rectangles have the same area.
Find the length of the second rectangle.



Question 5: A rectangle has an area of $80cm^2$ and a perimeter of 48cm.
Find the length and width of the rectangle.

Question 6: A rectangle has an area of $100cm^2$ and a perimeter of 104cm.
Find the length and width of the rectangle.

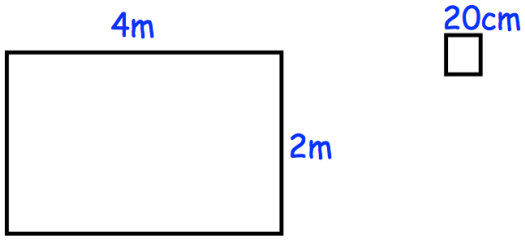
Question 7: Mr Jenkins has a grass lawn that is 24m wide and 30m long.
Mr Jenkins cuts the grass at a rate of $9m^2$ per minute.
How long will it take Mr Jenkins to cut all the grass?

Question 8: A football pitch is 110m long and has a perimeter of 360m.
Find the area of the football pitch.

Question 9: A rectangular room is 14m long and 8m wide.
Jessica is going to carpet the room with carpet that costs £17.50 per square metre.
Work out the cost of carpeting the room.

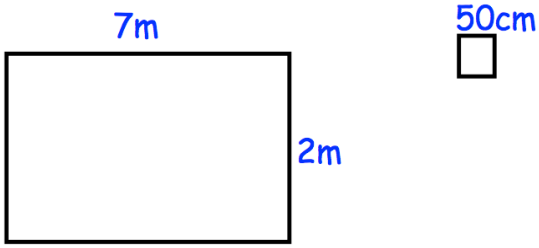
Extension

Question 10: Mr Harris is tiling his bathroom floor.
The bathroom floor is a rectangle measuring 4m by 2m.
Each tile is 20cm by 20cm.



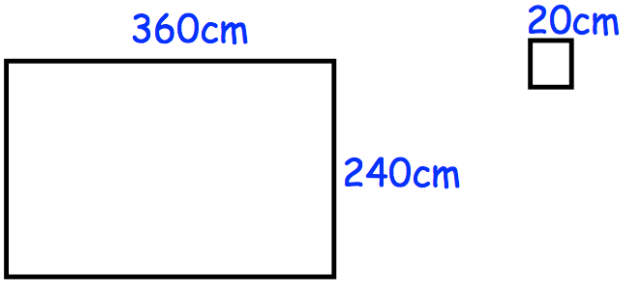
How many tiles does he need?

Question 11: Henry is tiling his kitchen wall.
The kitchen wall is a rectangle measuring 7m by 2m.
Each tile is 50cm by 50cm.



How many tiles does he need?

Question 12: Mrs Rodgers is tiling her bathroom wall.
The bathroom wall is 360cm long and 240cm high.
Each tile is 20cm by 20cm

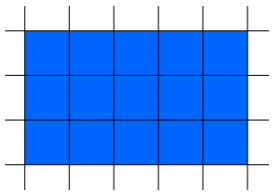


The tiles are sold in boxes of 6.
Each box costs £8.
How much will it cost Mrs Rodgers to tile her bathroom wall?

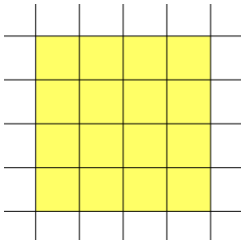
Fluency Practice

Find the area of the shapes on these cm^2 grids.

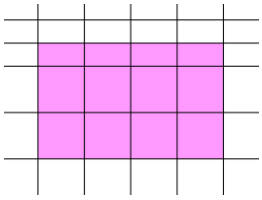
(a)



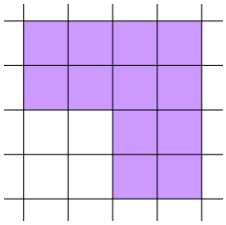
(b)



(c)

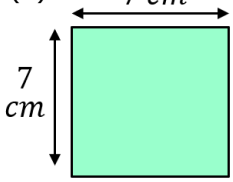


(d)

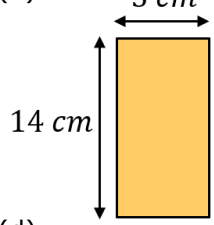


Find the area of each of these shapes.

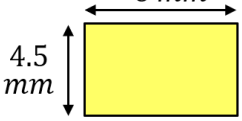
(a)



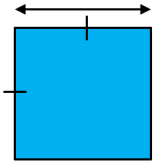
(b)



(c)

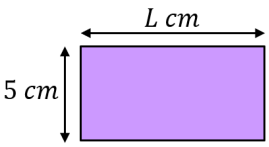


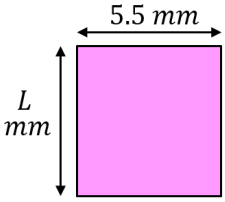
(d)



Given the area, find the missing length.

(a) $Area = 60\ cm^2$ (b) $Area = 27.5\ mm^2$



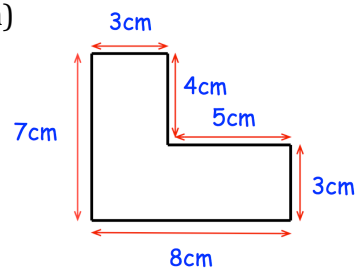


A rectangle has an area of $42\ cm^2$. Find as many possible pairs of lengths and widths as you can.

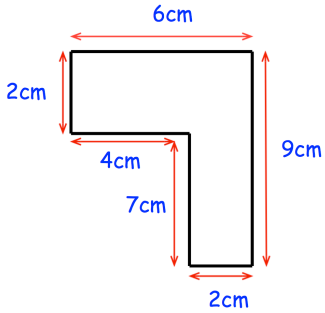
Fluency Practice

Question 1: Work out the area of each of these shapes.

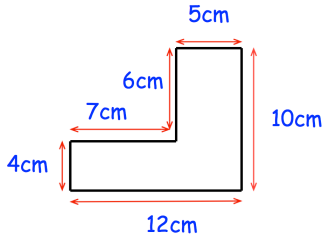
(a)



(b)

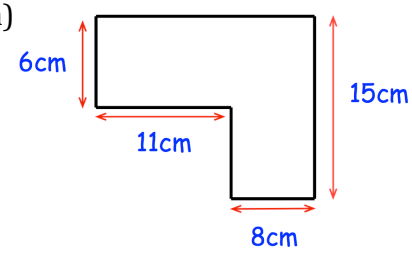


(c)

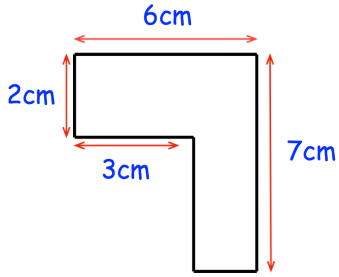


Question 2: Work out the area of each of these shapes.

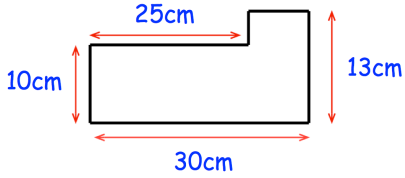
(a)



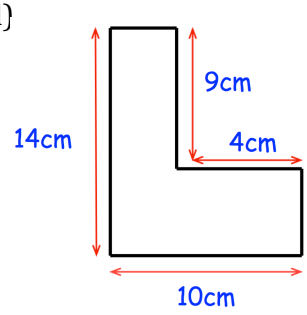
(b)



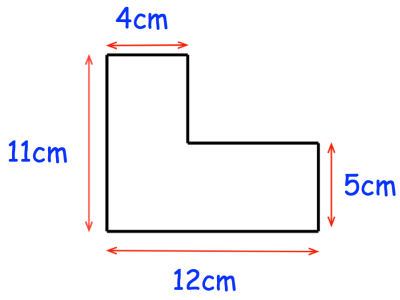
(c)



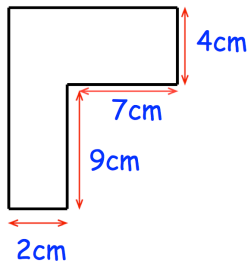
(d)



(e)



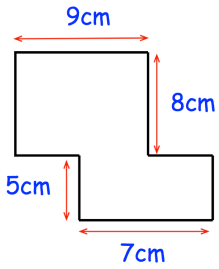
(f)



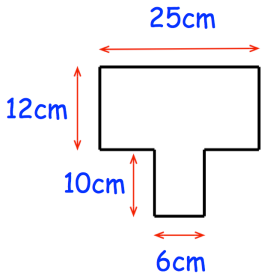
Fluency Practice

Question 1: Work out the area of each of these shapes.

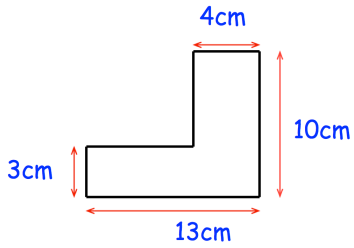
(a)



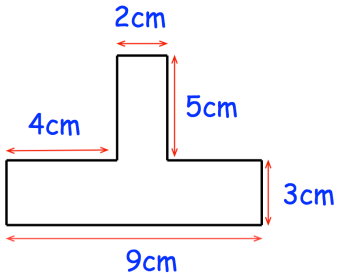
(b)



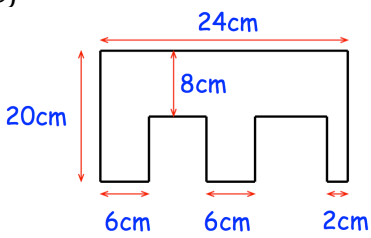
(c)



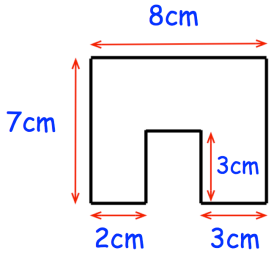
(d)



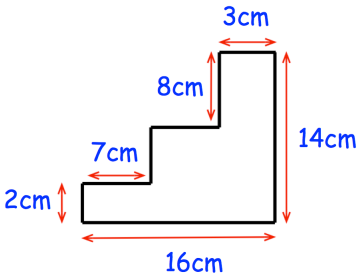
(e)



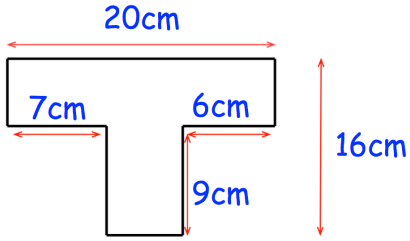
(f)



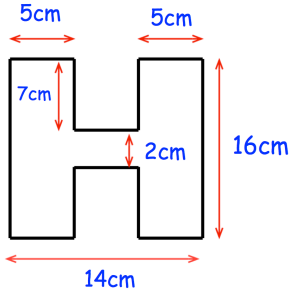
(g)



(h)

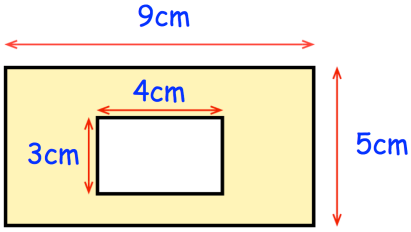


(i)

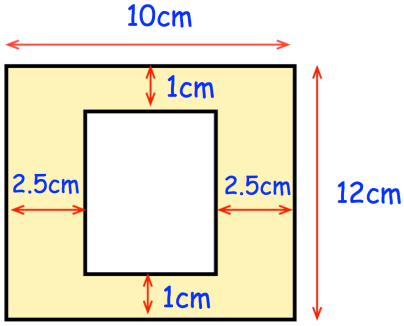


Question 2: Work out the shaded area.

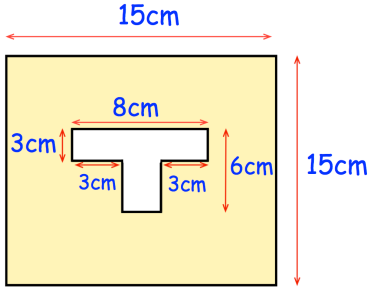
(a)



(b)



(c)

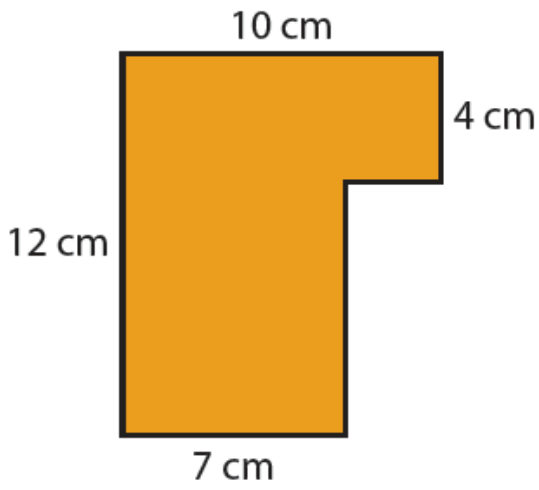


Extension

Sami worked out the area of the orange shape as $10 \times 4 + 8 \times 7 = 96\,cm^2$

Razina worked out the area as $12 \times 7 + 3 \times 4 = 96\,cm^2$

Lukas worked out the area as $10 \times 10 - 2 \times 2 = 96\,cm^2$

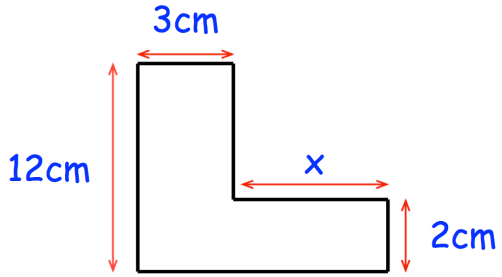


are you convinced by Sami, Razina or Lukas's reasoning?

explain your answer

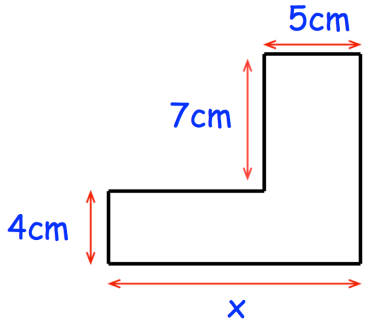
Question 3: The area of each shape is given.
Work out the size of the missing sides.

(a)



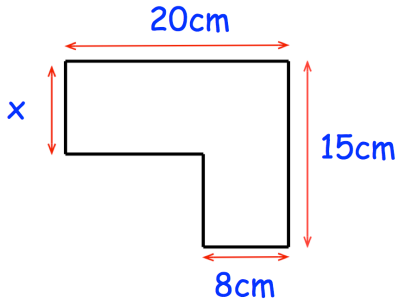
Total area = 48cm²

(b)



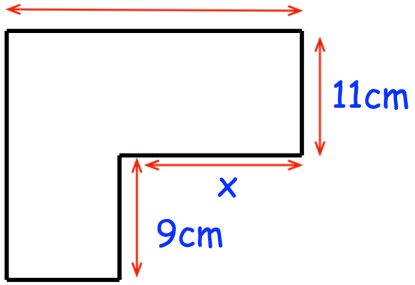
Total area = 91cm²

(c)



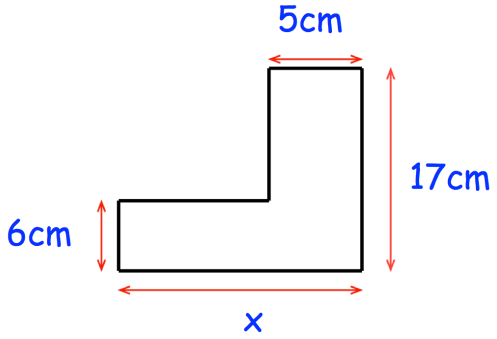
Total area = 228cm²

(d)



Total area = 283cm²

(e)

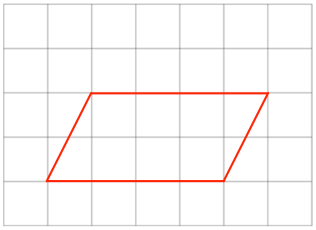


Total area = 151cm²

Fluency Practice

Question 1: The following parallelograms are drawn on centimetre-squared paper.
Find the area of each.

(a)

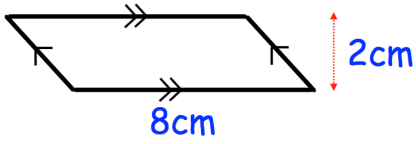


(b)

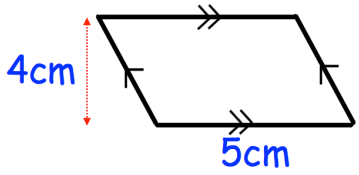
(c)

Question 2: Work out the area of each of the parallelograms below.
Include suitable units.

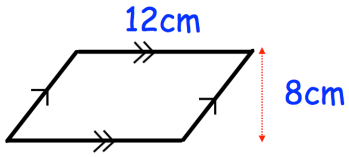
(a)



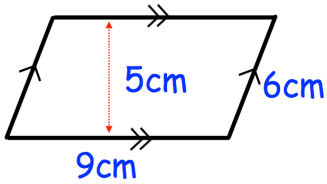
(b)



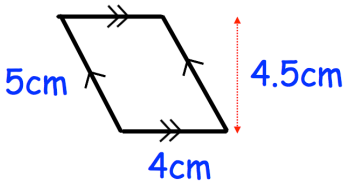
(c)



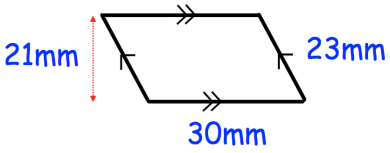
(d)



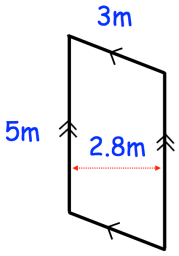
(e)



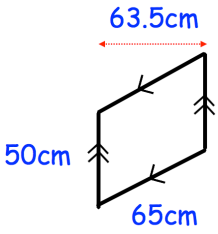
(f)



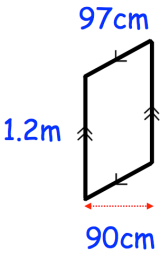
(g)



(h)



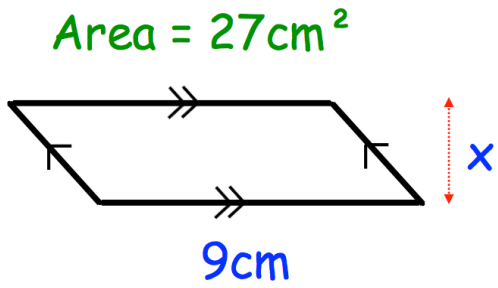
(i)



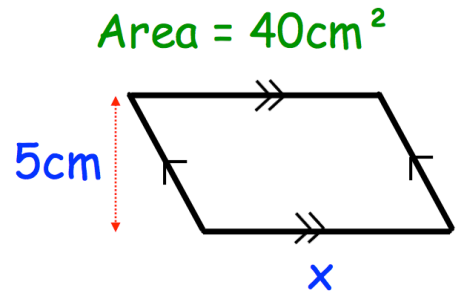
Question 3: A parallelogram has a base of 8cm and a perpendicular height of 6cm.
Calculate the area of the parallelogram.

Question 4: The areas of each of the parallelograms has been given.
Calculate the length of the missing sides.

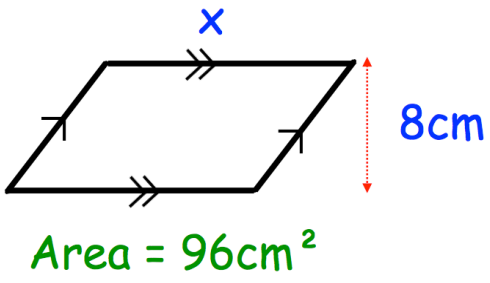
(a)



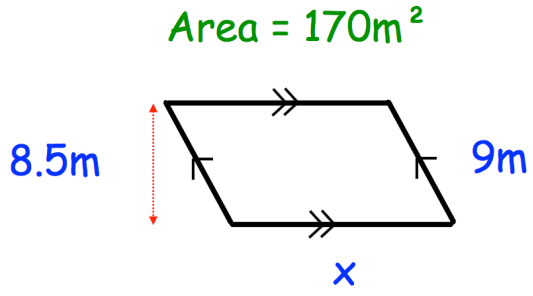
(b)



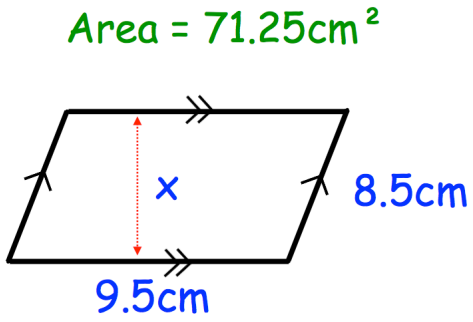
(c)



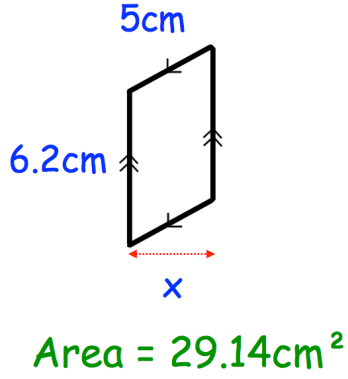
(d)



(e)



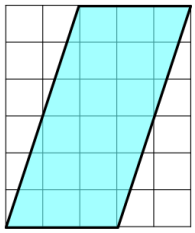
(f)



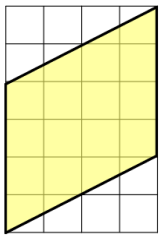
Fluency Practice

Find the area of each of these parallelograms on these cm^2 grids.

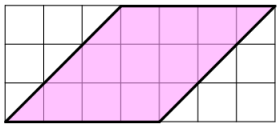
(a)



(b)

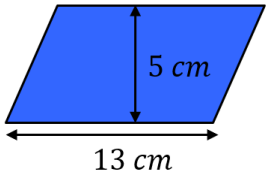


(c)

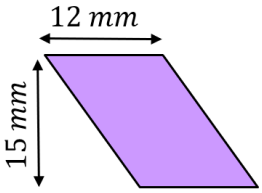


Calculate the area of each of these parallelograms.

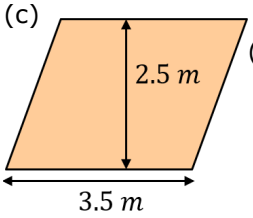
(a)



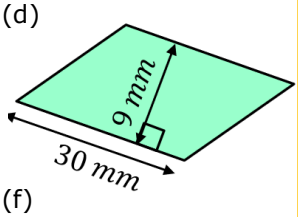
(b)



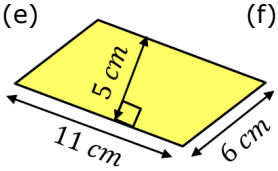
(c)



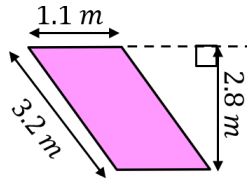
(d)



(e)

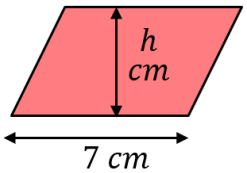


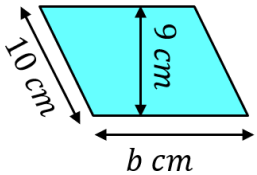
(f)



Find the missing measurements in each of these parallelograms, given their area.

(a) $Area = 42\ cm^2$ (b) $Area = 67.5\ cm^2$



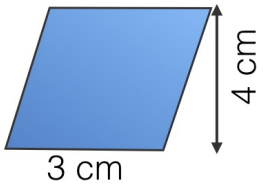


Fluency Practice

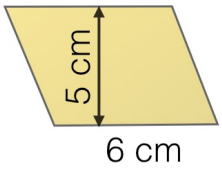
Alpha Exercise

Find the area of each of the following parallelograms:

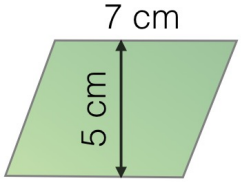
(1)



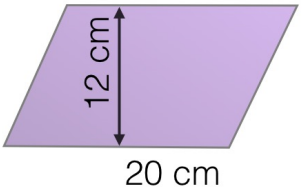
(2)



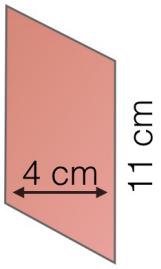
(3)



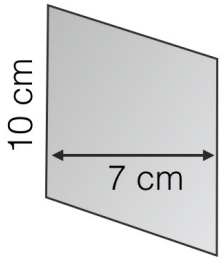
(4)



(5)



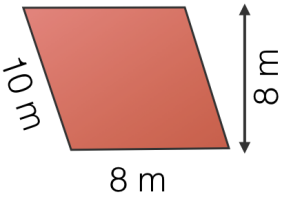
(6)



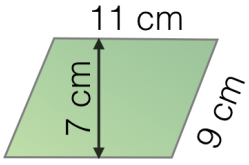
Beta Exercise

Find the area of each of the following parallelograms:

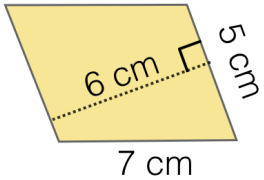
(1)



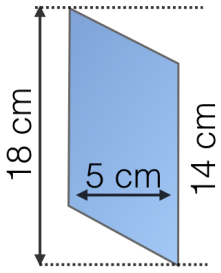
(2)



(3)



(4)

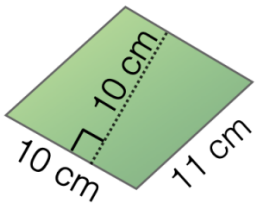


Fluency Practice

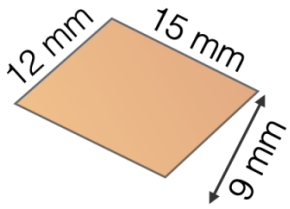
Gamma Exercise

Find the area of each of the following parallelograms:

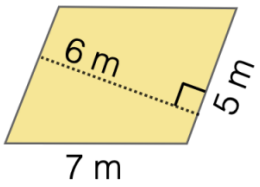
(1)



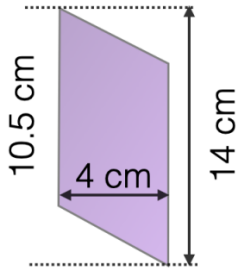
(2)



(3)



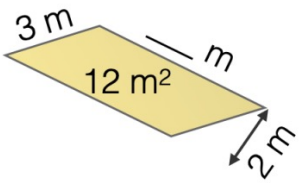
(4)



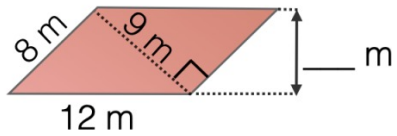
Delta Exercise

Here are four parallelograms.
Fill in the missing values in each diagram.

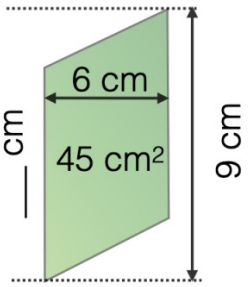
(1)



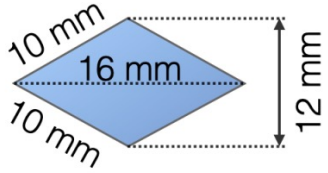
(2)



(3)



(4)



Area= ___ mm²

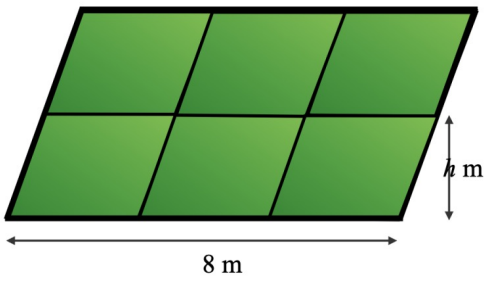
Exam Questions

Exam-style question 1

Six identical parallelograms are tiled as shown to form one large parallelogram with a base of 8 metres, as shown in the diagram.

This large parallelogram has a total area of 32 m^2.

Work out the height, h, of one tile, in metres.

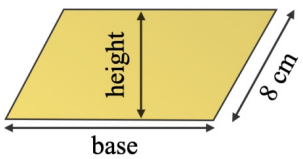


Exam-style question 2

Keith draws a parallelogram whose base is twice its perpendicular height.

The area of the parallelogram is 72 cm^2 and the two sides which are not parallel to the base are 8 cm long.

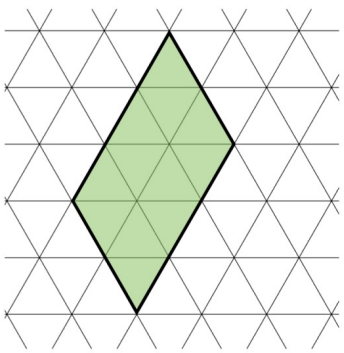
Find the base and height of the parallelogram.



Exam-style question 3

Here is a grid made up of equilateral triangles. Each small triangle has an area of 5 cm^2.

What is the area of the shaded parallelogram?



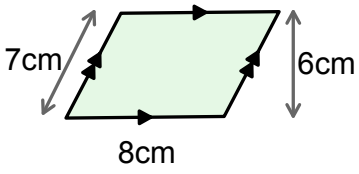
Fluency Practice

learn by heart

Area of Squares, Rectangles & Parallelograms: *base × perpendicular height*

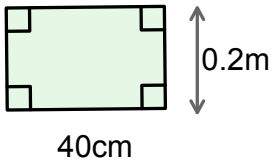
examples

Calculate the area



= 8 × 6
= 48cm²

Calculate the area

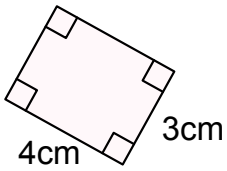


= 0.2 × 0.4
= 0.08m²

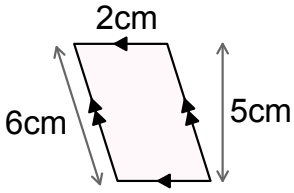
exercise 8f

1. Work out the area of each shape. Pay careful attention to the units.

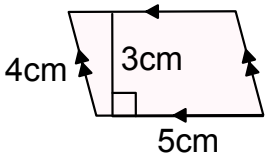
a)



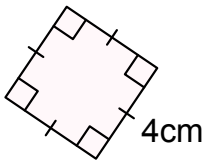
b)



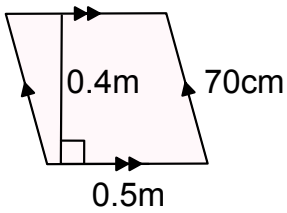
c)



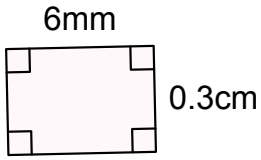
d)



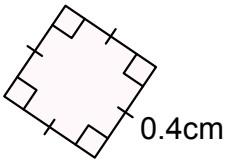
e)



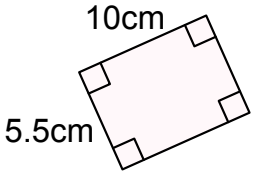
f)



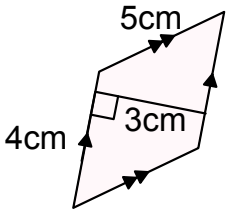
g)



h)

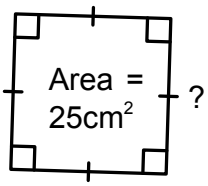


i)

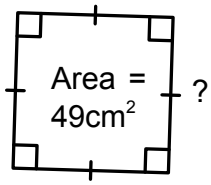


2. Given the area, work out the side length of each of these squares:

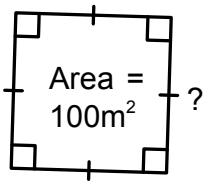
a)



b)

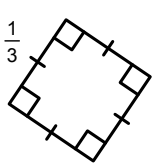


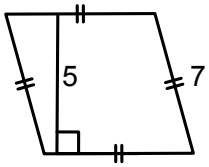
c)

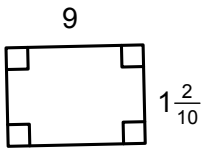


Fluency Practice

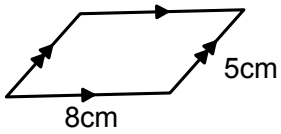
3. In these shapes, all lengths given are in centimetres.
Calculate the area, giving your answer as a decimal:

a) 

b) 

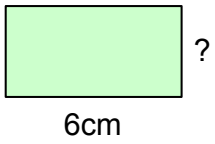
c) 

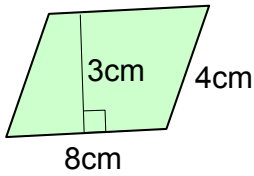
4. Explain why we can't work out the area of this shape:



5. This rectangle and parallelogram have the same area.

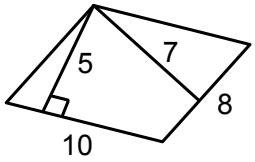
Can you work out the length marked ?





6. Which calculation works out the area of this parallelogram?

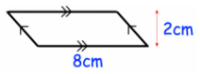
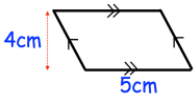
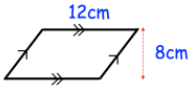
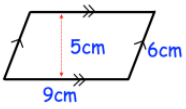
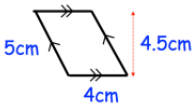
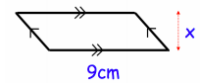
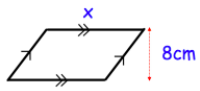
a) 5 × 10 b) 10 × 8 c) 7 × 8 d) 5 × 7



7. The grid is made of 1cm by 1cm squares.
Draw three different parallelograms with an area of 10cm^2

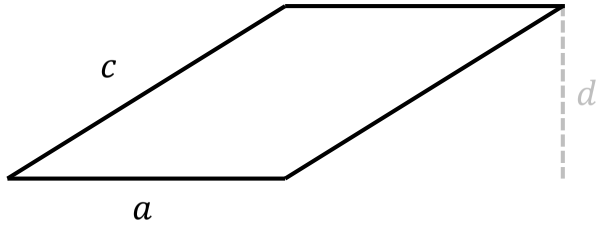
8. This grid is made of 1cm by 1cm squares.
Draw three squares with areas of 4cm^2 , 9cm^2 and 16cm^2

Fill in the Gaps

Question	Diagram	Base	Perpendicular Height	Calculation	Area
(a)		8 cm	2 cm	8×2	16 cm^2
(b)					
(c)					
(d)					
(e)					
(f)					27 cm^2
(g)		5 cm			40 cm^2
(h)					48 mm^2
(i)					
(j)					xy cm^2

Fill in the Gaps

Complete the tables for the parallelogram below.



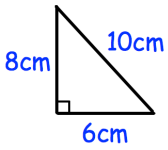
	a	c	d	Area	Perimeter
1.	5 cm	4 cm	3 cm		
2.	6 cm	5 cm	3 cm		
3.		3 cm	2 cm	22 cm^2	
4.	4 cm	10 cm		28 cm^2	
5.		7 cm	4 cm		28 cm
6.	2 cm		14 cm		36 cm
7.		10 cm		30 cm^2	30 cm

	a	c	d	Area	Perimeter
8.	5 **mm**	10 **cm**	6 **cm**	cm^2	cm
9.	5 **m**	1 **m**	60 **cm**	m^2	m
10.	$\frac{1}{2}$ cm	$\frac{1}{4}$ cm	$\frac{1}{5}$ cm		
11.	$\frac{3}{5}$ cm		$\frac{2}{3}$ cm		2 cm
12.		$3\frac{2}{5}$ cm	$3\frac{1}{3}$ cm	2 cm^2	
13.	x cm	x cm	2 cm		
14.	x cm	2 cm	x cm		
15.	x cm	2 cm		x cm^2	
16.	2 cm		x cm		x cm

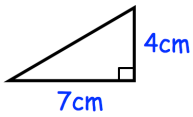
Fluency Practice

Question 1: Find the area of each triangle.

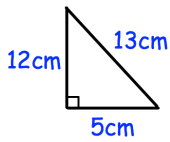
(a)



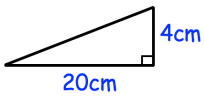
(b)



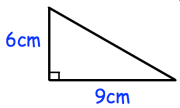
(c)



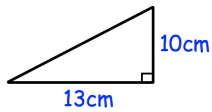
(d)



(e)

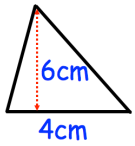


(f)

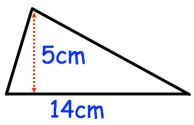


Question 2: Find the area of each triangle.

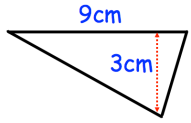
(a)



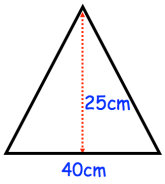
(b)



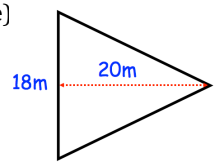
(c)



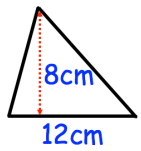
(d)



(e)

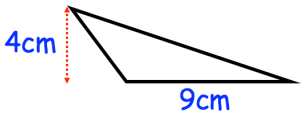


(f)

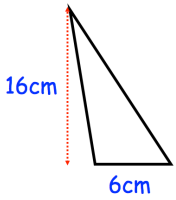


Question 3: Find the area of each triangle.

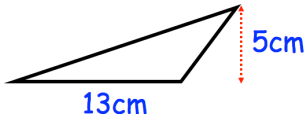
(a)



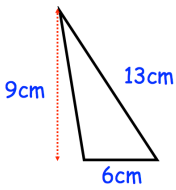
(b)



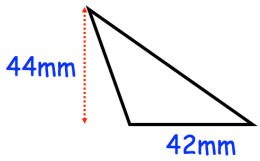
(c)



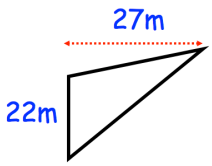
(d)



(e)



(f)



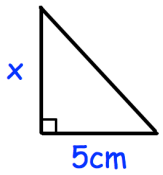
Question 4: Find the area of the triangle with a base of 12cm and perpendicular height of 9cm.

Question 5: Find the area of the triangle with a base of 9cm and perpendicular height of 14cm.

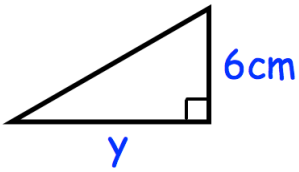
Question 6: Find the area of the triangle with a base of 19cm and perpendicular height of 7cm.

Fluency Practice

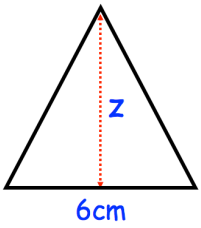
Question 7: The area of the triangle is $20cm^2$, find x.



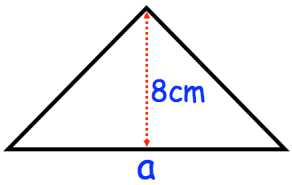
Question 8: The area of the triangle is $30cm^2$, find y.



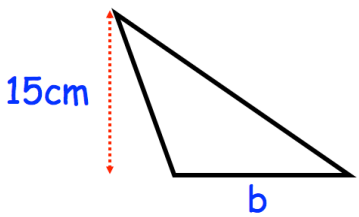
Question 9: The area of the triangle is $12cm^2$, find z.



Question 10: The area of the triangle is $56cm^2$, find a.



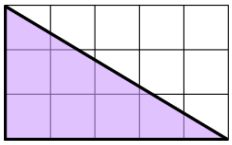
Question 11: The area of the triangle is $165cm^2$, find b.



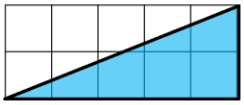
Fluency Practice

Find the area of the triangles on these cm^2 grids.

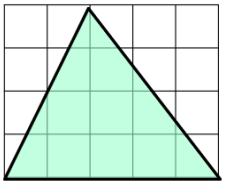
(a)



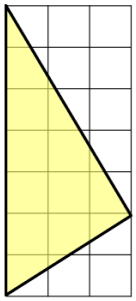
(b)



(c)

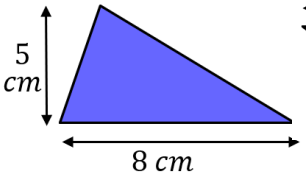


(d)

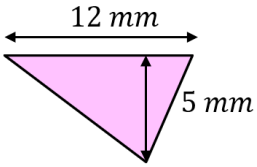


Find the area of each of these triangles.

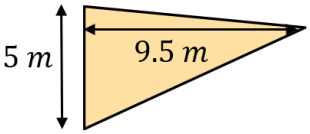
(a)



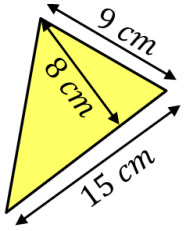
(b)



(c)

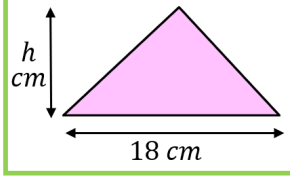


(d)

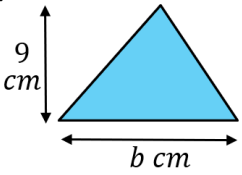


Given the area, find the missing base or height.

(a) $Area = 72\ cm^2$



(b) $Area = 22.5\ mm^2$



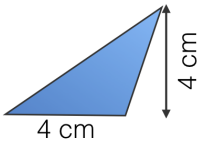
A triangle has an area of $32\ cm^2$. Find as many possible pairs of bases and heights as you can.

Fluency Practice

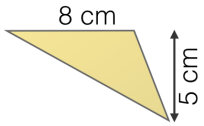
Alpha Exercise

Find the area of each of the following triangles:

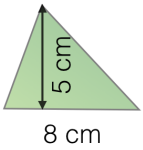
(1)



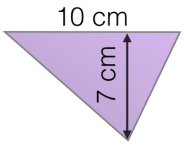
(2)



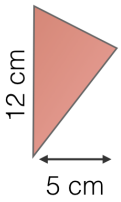
(3)



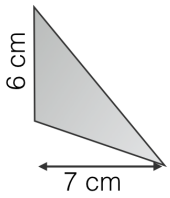
(4)



(5)



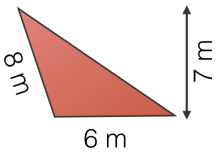
(6)



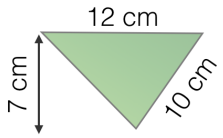
Beta Exercise

Find the area of each of the following triangles:

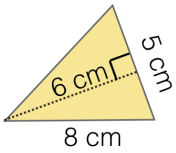
(1)



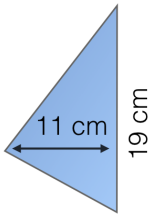
(2)



(3)



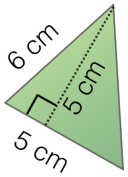
(4)



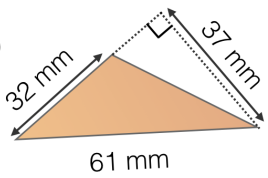
Gamma Exercise

Find the area of each of the following triangles:

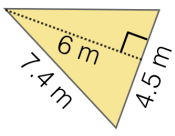
(1)



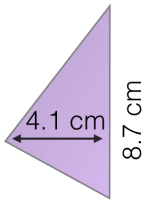
(2)



(3)



(4)

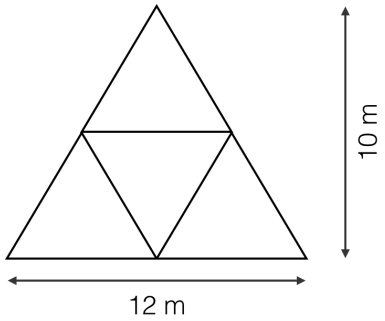


Exam Questions

Exam-style question 1

Four identical triangles are tiled as shown to form one large triangle with a base of 12 metres, and a height of 10 metres, as shown in the diagram.

Work out the area of one tile.

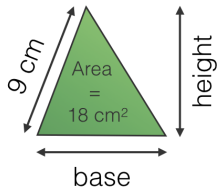


Exam-style question 2

Tyler draws a triangle whose base is equal to its perpendicular height.

The area of the triangle is 18 cm^2, and one of the sides is 9 cm long.

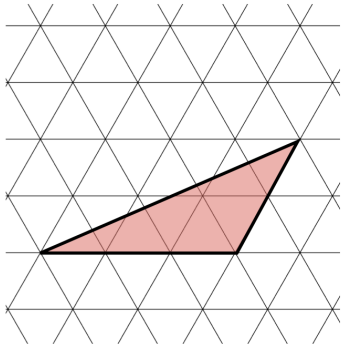
Find the base and height of the triangle.



Exam-style question 3

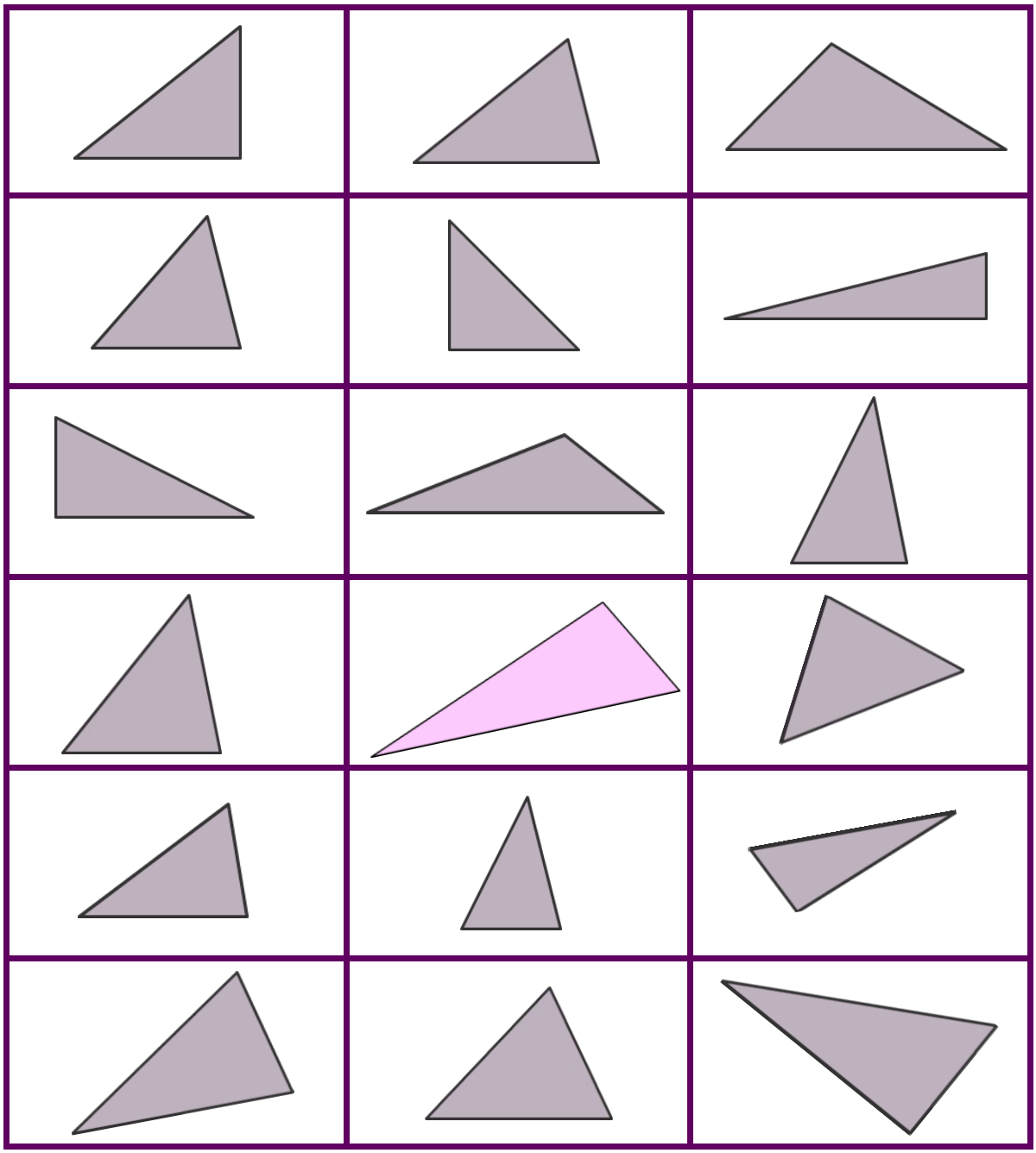
Here is a grid made up of equilateral triangles. Each small triangle has an area of 5 cm^2.

What is the area of the shaded triangle?



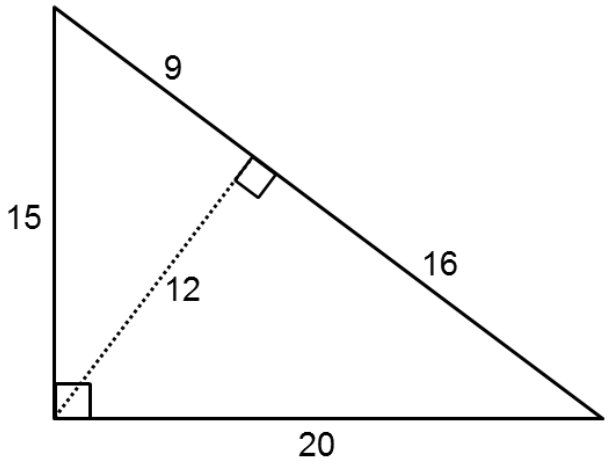
biggest area

in each row, which triangle is largest?

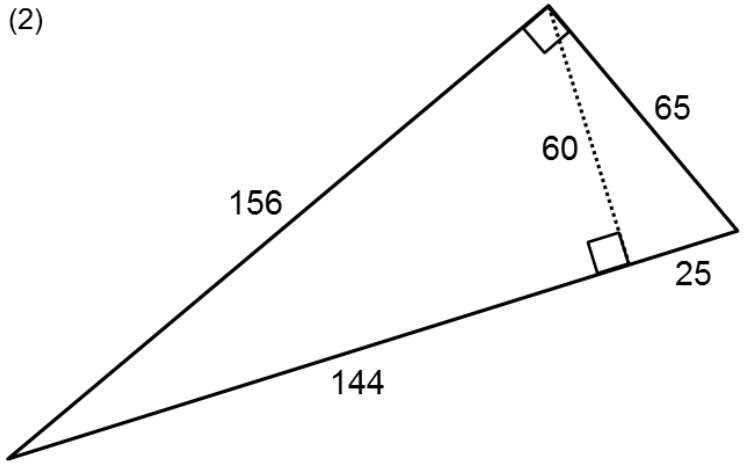


work out the area of the triangles, then work out the area another way

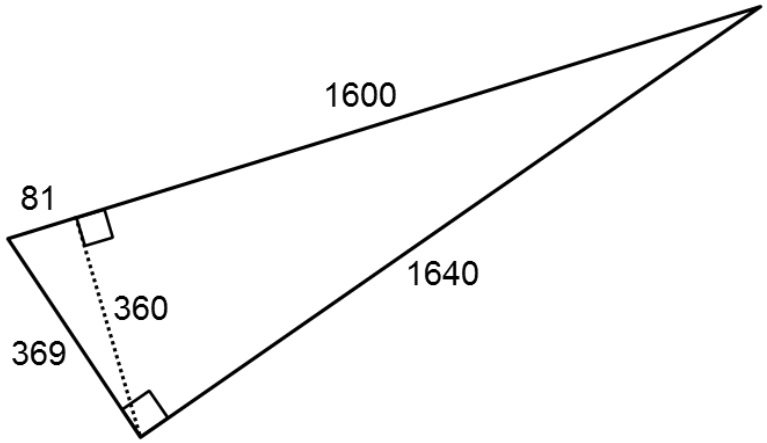
(1)



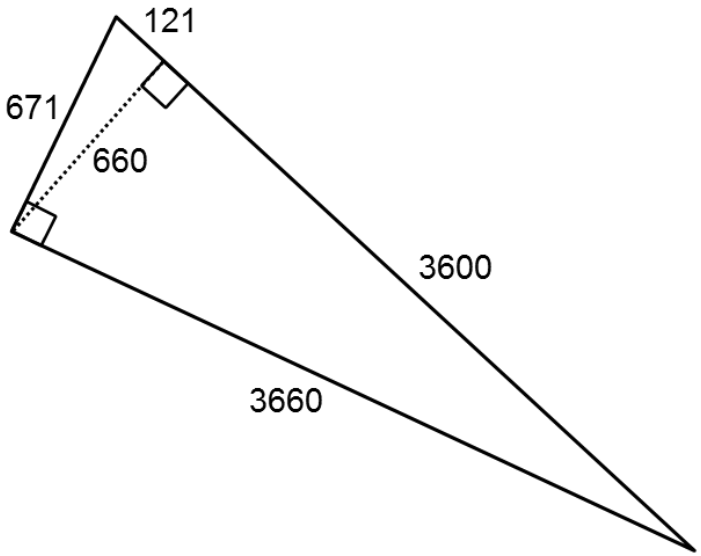
(2)



(3)



(4)



Fluency Practice

learn by heart

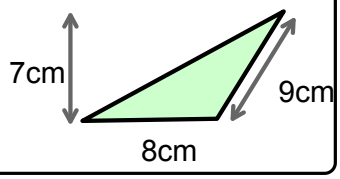
Area of a Triangle:
(*base* × *perpendicular height*) ÷ 2

example

Calculate the area

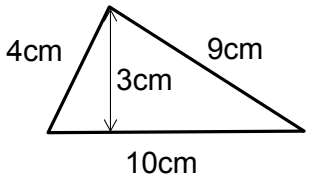
$= \frac{1}{2} \times 8 \times 7$

$= 28cm^2$



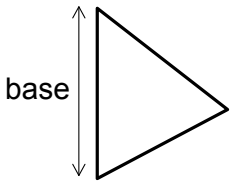
exercise 8g

1. In this triangle, the base is _____ long and the perpendicular height is _____ long.

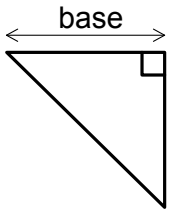


2. On each triangle the **base** is shown.
Draw on the perpendicular height.

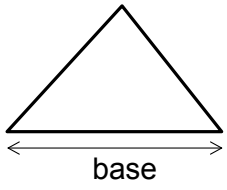
a)



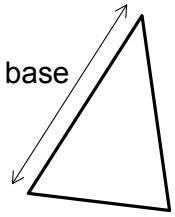
b)



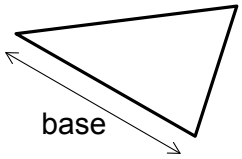
c)



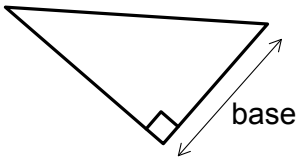
d)



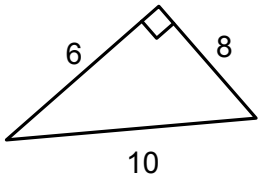
e)



f)



3. Which calculation works out the area of this triangle?



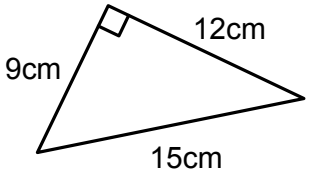
a) $\frac{10 \times 6}{2}$

b) $\frac{6 + 8}{2}$

c) $\frac{6 \times 8}{2}$

d) $\frac{10 \times 8}{2}$

4. Which calculation can be used to work out the area of this triangle?



a) $\frac{15 \times 9}{2}$

b) $\frac{15 \times 12}{2}$

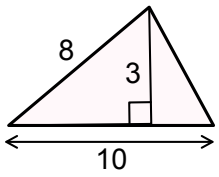
c) $\frac{9 \times 12}{2}$

d) $\frac{9 \times 12 \times 15}{2}$

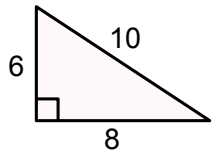
Fluency Practice

5. Calculate the area of each triangle. Lengths are all measured in cm.

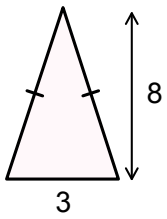
a)



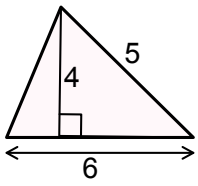
b)



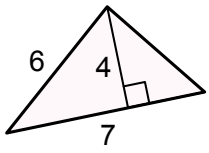
c)



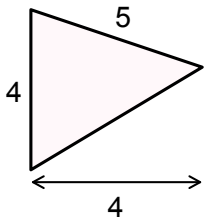
d)



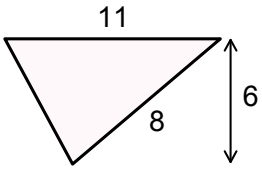
e)



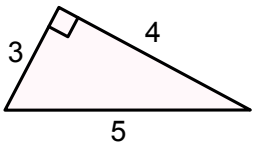
f)



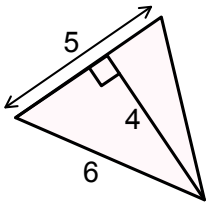
g)



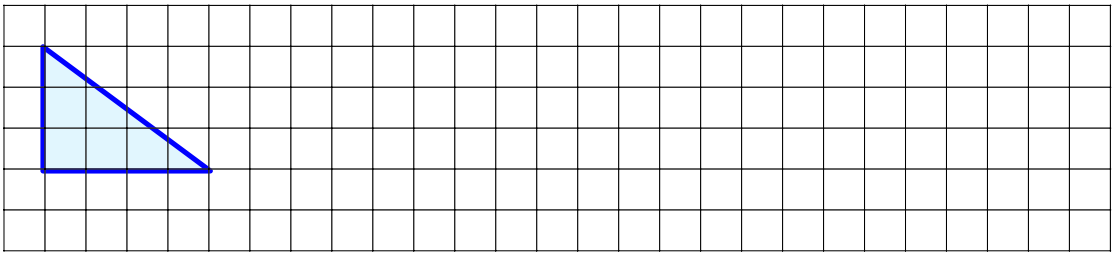
h)



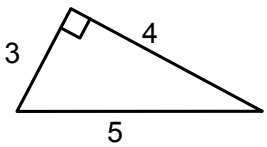
i)

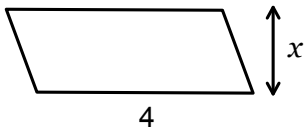


6. On the grid, draw two more triangles with the same area as the one given:

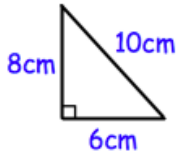
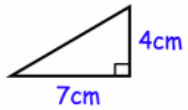
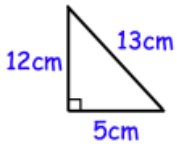
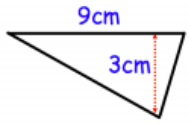
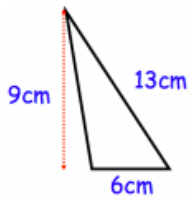


7. The area of the triangle is 3 times bigger than the area of the parallelogram.
Work out x.





Fill in the Gaps

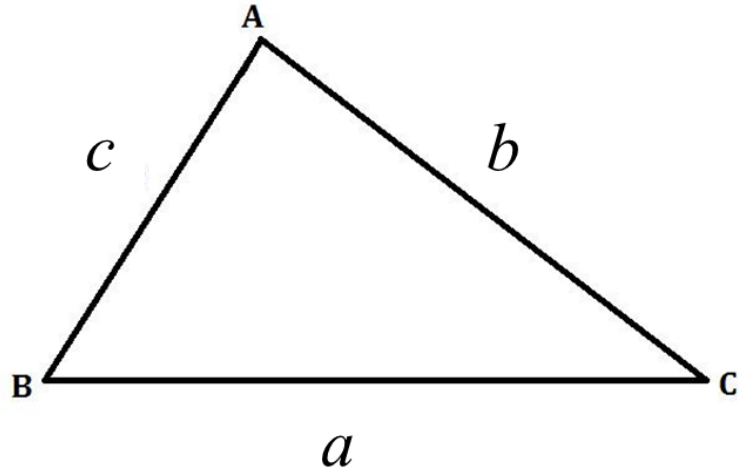
Question	Diagram	Base	Height	Calculation	Area
(a)		6 cm	8 cm	$\frac{6 \times 8}{2}$	24 cm^2
(b)					
(c)					
(d)					
(e)					
(f)		7 m	6 m	$\frac{7 \times 6}{2}$	
(g)				$\frac{3 \times 5}{2}$	
(h)		8 mm			12 mm^2
(i)					18 cm^2

Heron's (or Hero's) formula for the area of a triangle

$s = ½ (a + b + c)$

then area, A =

$$\sqrt{s(s-a)(s-b)(s-c)}$$



show that these triangles all have whole number (integer) areas:

1) 5 , 5 , 6
2) 13 , 14 , 15
3) 4 , 13 , 15

show that these triangles all have area value = perimeter value:

1) 9 , 10 , 17
2) 7 , 15 , 20
3) 6 , 25 , 29

Extension

More-Same-Less

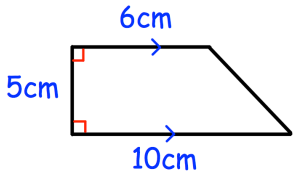
Instructions: Calculate the value in the middle box. The complete the remaining boxes trying to make the minimal change possible.

Height	Area: Less	Area: Same	Area: More
More			
Same			
Less			

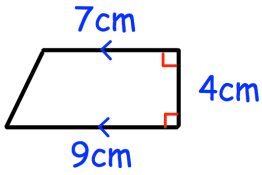
Fluency Practice

Question 1: Find the area of each trapezium.

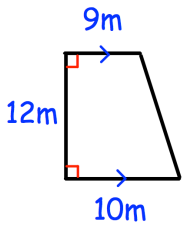
(a)



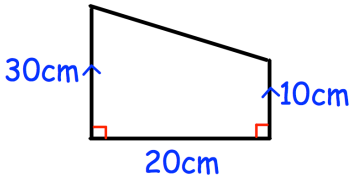
(b)



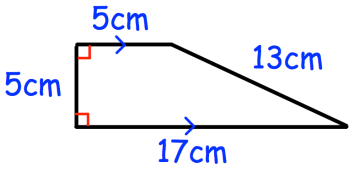
(c)



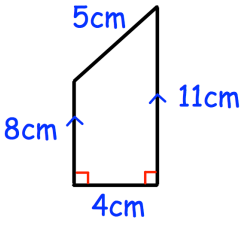
(d)



(e)

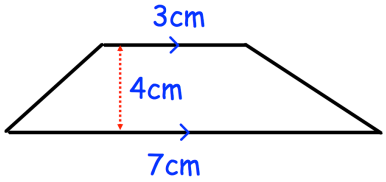


(f)

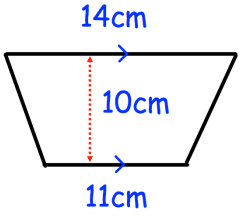


Question 2: Find the area of each trapezium.

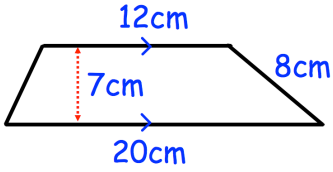
(a)



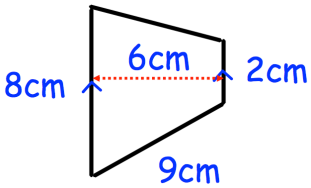
(b)



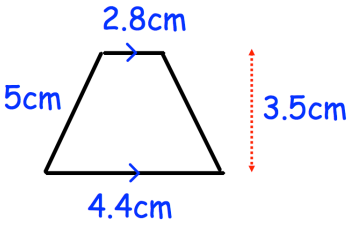
(c)



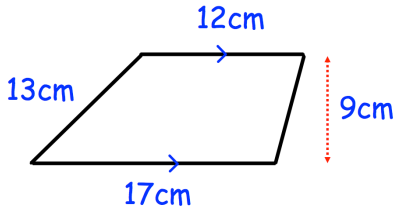
(d)



(e)



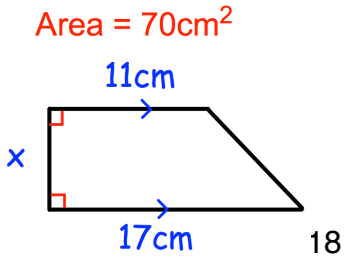
(f)



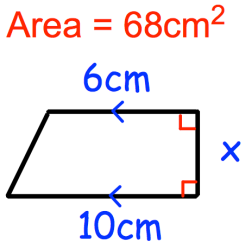
Fluency Practice

Question 3: Find x for each trapezium.

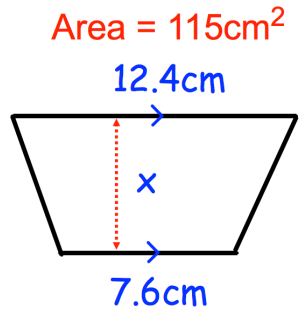
(a)



(b)

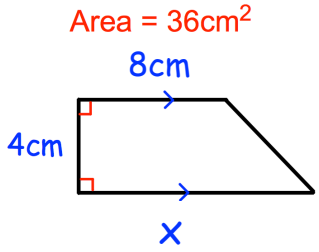


(c)

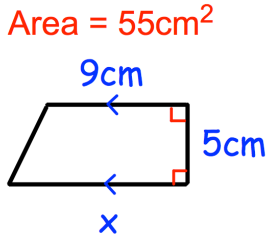


Question 4: Find x for each trapezium.

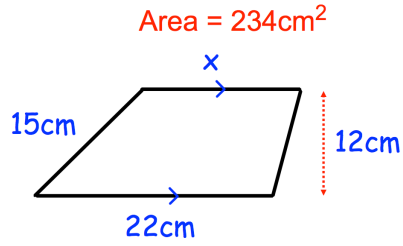
(a)



(b)



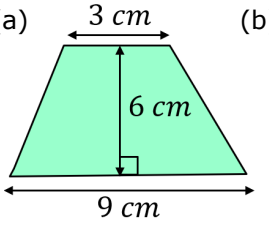
(c)



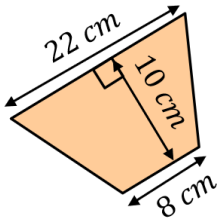
Fluency Practice

Find the area of each of these trapezia.
Give units with your answer.

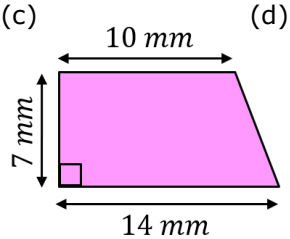
(a)



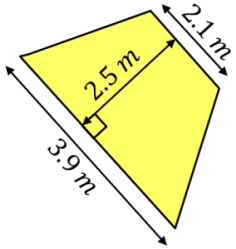
(b)



(c)

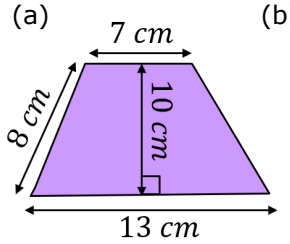


(d)

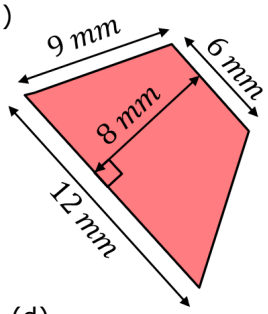


Calculate the area each of these trapezia.
Give units with your answer.

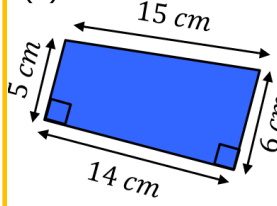
(a)



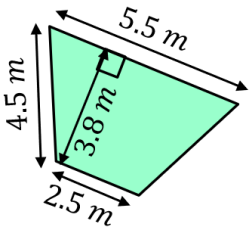
(b)



(c)

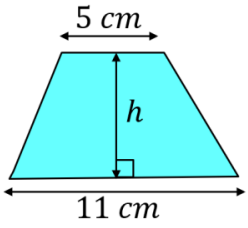


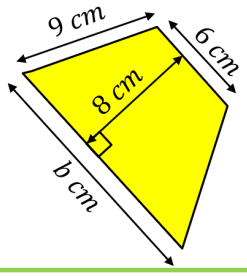
(d)



Find the missing measurements in each of these trapezia given their areas.

(a) $Area = 48\ cm^2$ (b) $Area = 72\ cm^2$



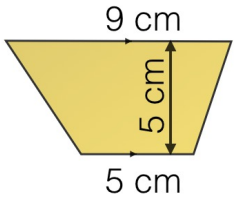


Fluency Practice

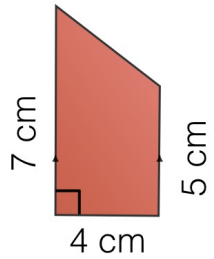
Alpha Exercise

Find the area of each of the following trapeziums:

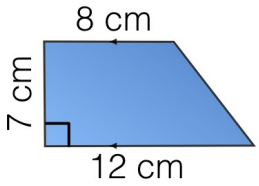
(1)



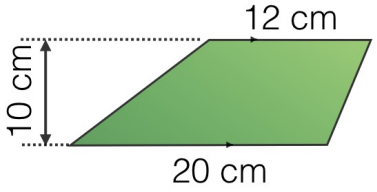
(2)



(3)



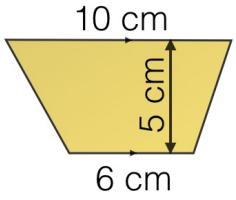
(4)



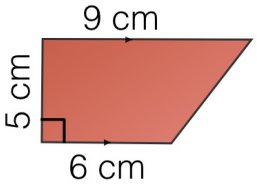
Beta Exercise

Find the area of each of the following trapeziums:

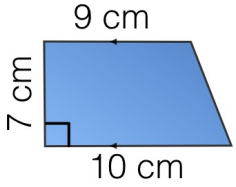
(1)



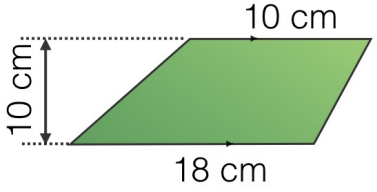
(2)



(3)



(4)

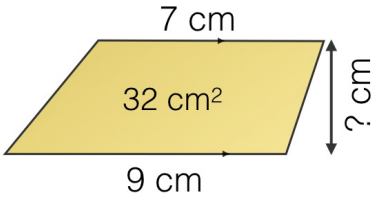


Fluency Practice

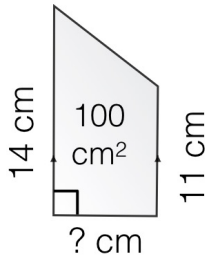
Gamma Exercise

Find the missing length in each trapezium, given its area:

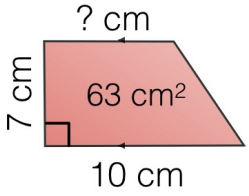
(1)



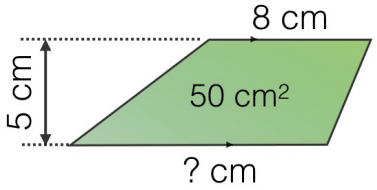
(2)



(3)

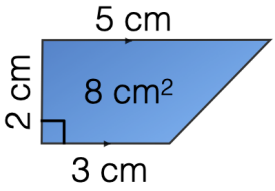


(4)

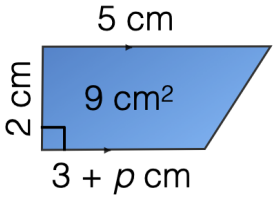


Delta Exercise

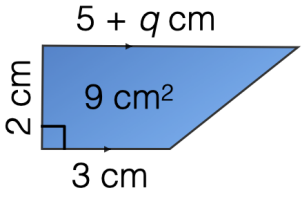
The area of this trapezium is 8 cm². You want to increase its area to 9 cm² by extending the length of one of the three indicated sides. You can do this in three ways:



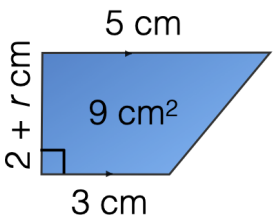
Trapezium 1



Trapezium 2



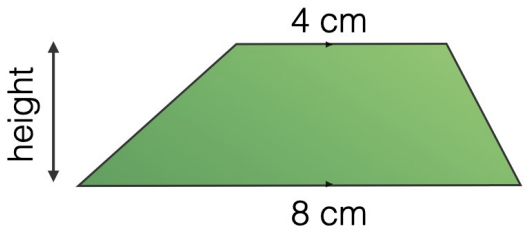
Trapezium 3



(a) Find the values of p, q and r.
(b) Which trapezium has the longest *unlabelled* edge?

Exam-style question 1

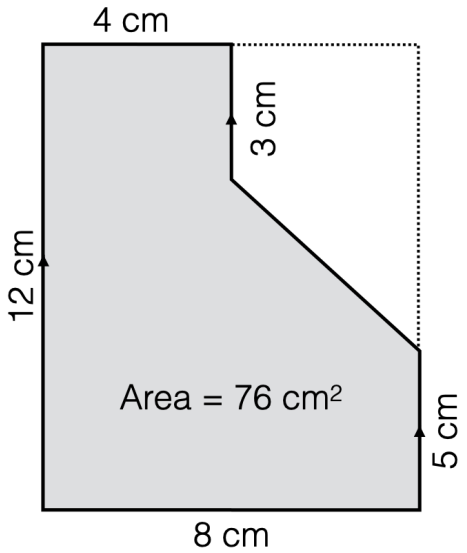
The trapezium in the diagram has an area of 18 cm^2. Find its height.



Exam-style question 2

An 8 × 12 cm rectangle of paper has had a piece cut out of it, as shown in the diagram.

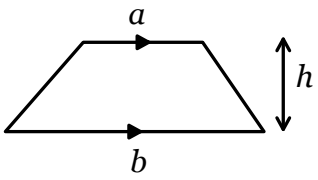
By calculating the area of the piece that was cut out, show that the remaining paper has an area of 76 cm^2.



Fluency Practice

learn by heart

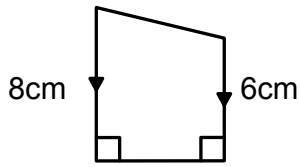
Area of a Trapezium: $\frac{a + b}{2} \times h$



a and b are the parallel sides of a trapezium

example

Calculate the area:

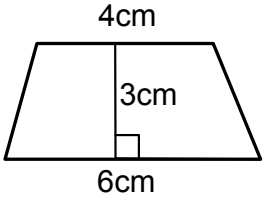


$$\text{Area} = \frac{8 + 6}{2} \times 4$$
$$= \frac{14}{2} \times 4$$
$$= 7 \times 4$$
$$= 28\text{cm}^2$$

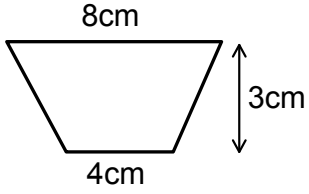
exercise 8h

1. Calculate the area of each trapezium:

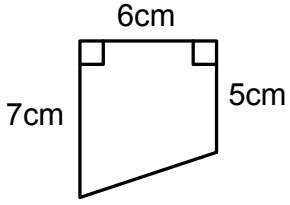
a)



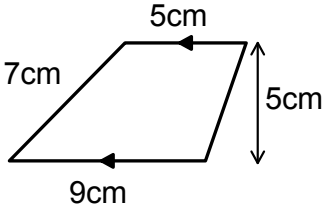
b)



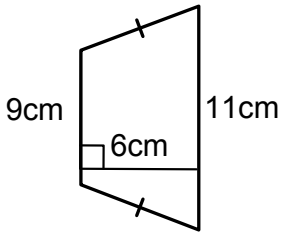
c)



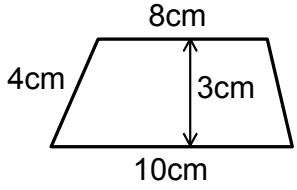
d)



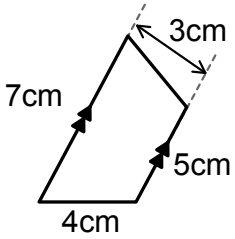
e)



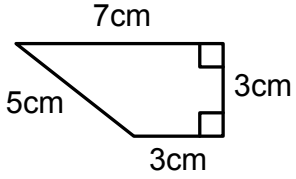
f)



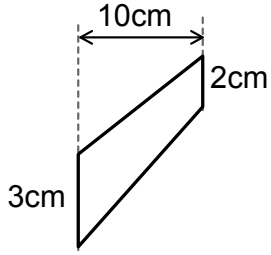
g)



h)



i)



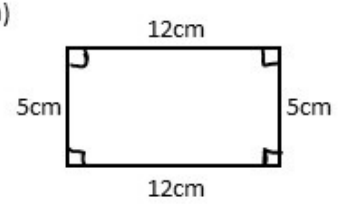
Areas of Trapezia

Areas of trapezia

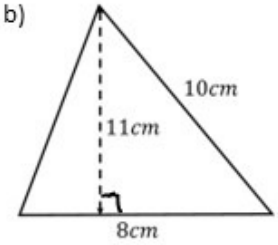
1. Factual recall

Find the areas of these shapes:

a)



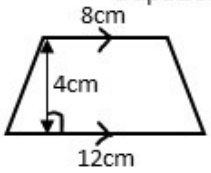
b)



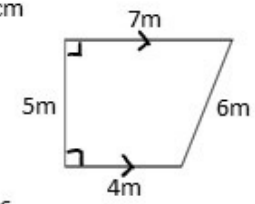
2. Carry out a routine procedure

Find the area of the following trapezia:

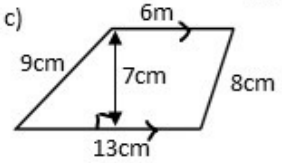
a)



b)



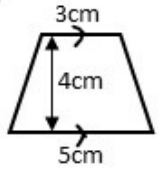
c)



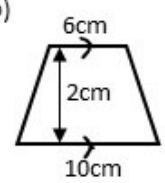
3. Classify some mathematical object

Which of the following trapezia have the same area?

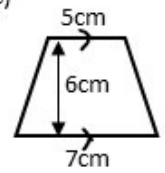
a)



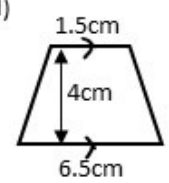
b)



c)

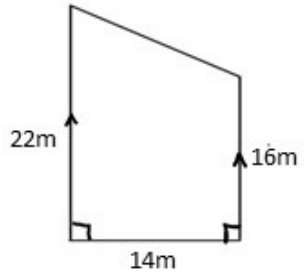


d)



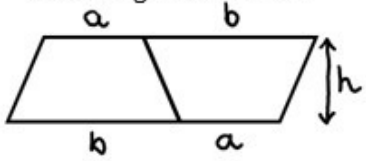
4. Interpret a situation or answer

A grass lawn has the following shape, a box of grass feed spreads over an area of $40m^2$. At a cost of £4.99 per box, how much will it cost to feed the lawn.



5. Prove, show, justify

Two identical trapeziums are arranged as follows.

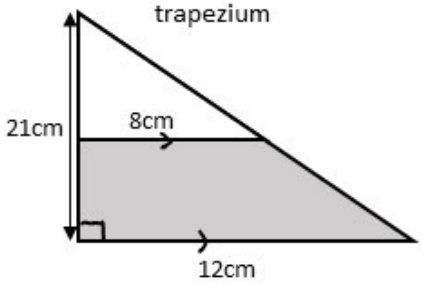


Using the above diagram, show that:

$A_T = \frac{1}{2}(a+b)h$

6. Extend a concept

Find the area of the shaded trapezium

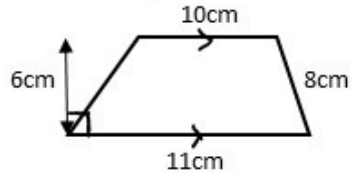


7. Construct an instance

Create a trapezium with an area of $35cm^2$

8. Criticise a fallacy

A student found the area of the following trapezium, find and amend any mistakes made.



$A = \frac{1}{2}(10+11)\times 8$

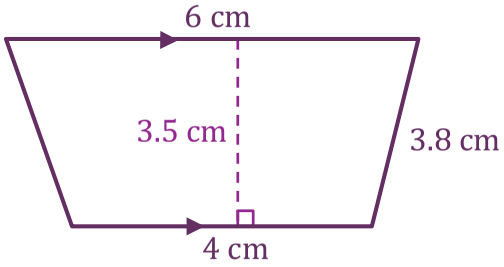
$= 4 \times 21$

$= 84cm^2$

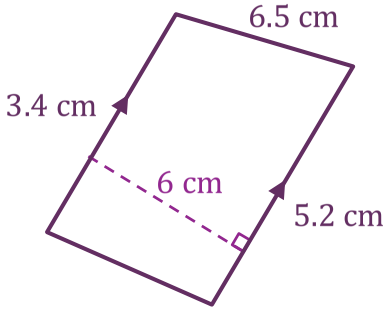
Areas of Trapeziums with... Fractions and Decimals

Find the area of each trapezium.

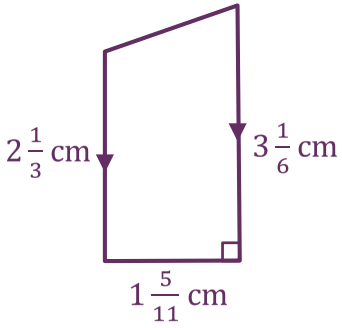
a)



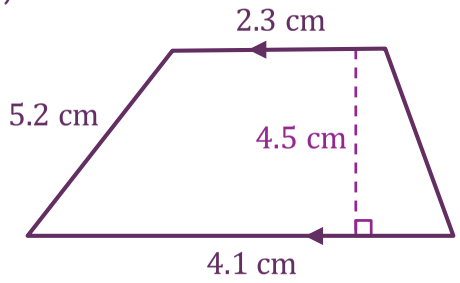
b)



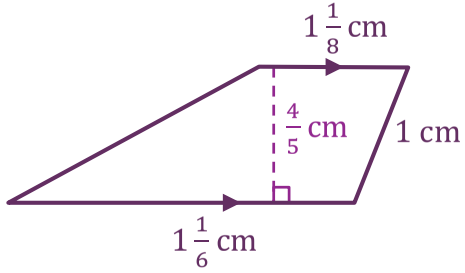
c)



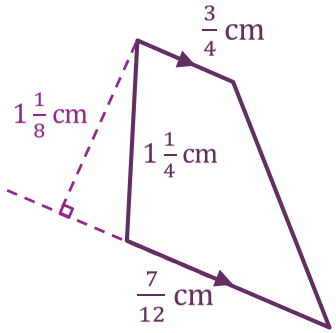
d)



e)



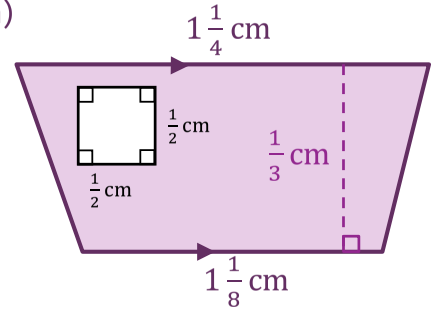
f)



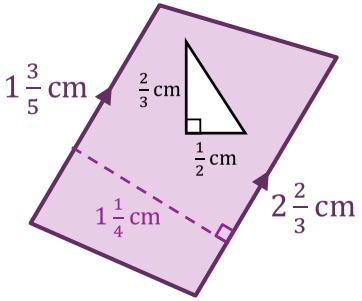
Areas of Trapeziums with... Fractions and Decimals

Find each shaded area.

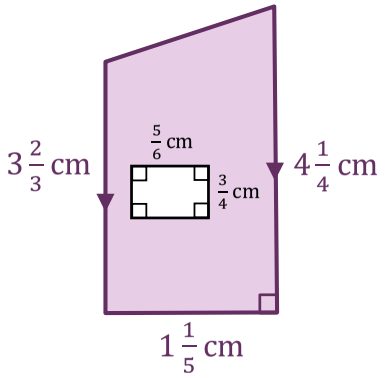
a)



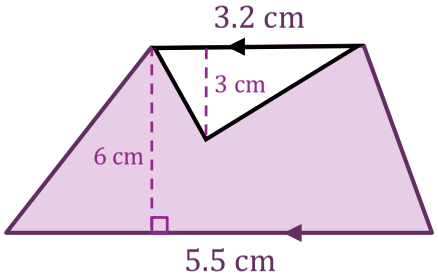
b)



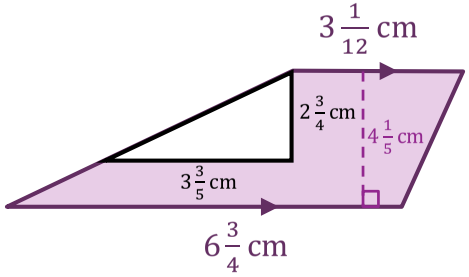
c)



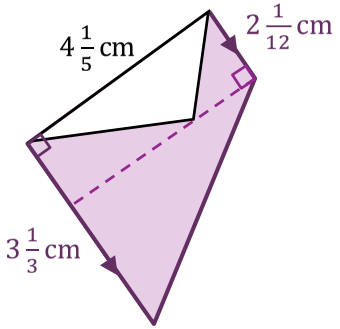
d)



e)



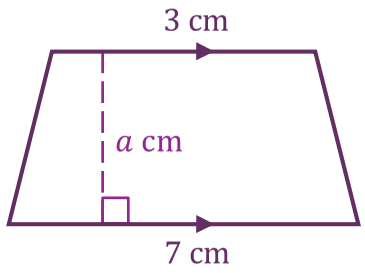
f)



Solving Equations with...

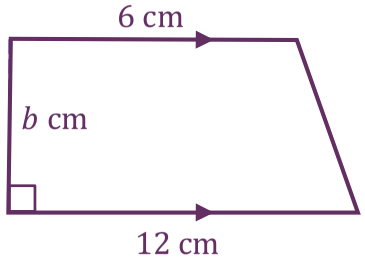
Areas of Trapeziums

a)



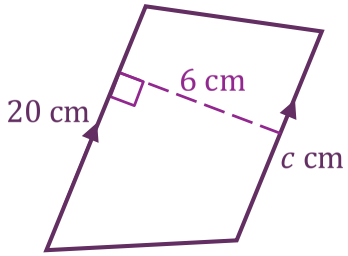
Area $= 55\ \text{cm}^2$ $a =$ ☐ cm

b)



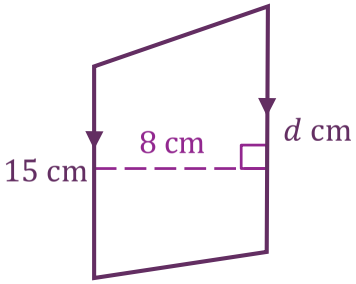
Area $= 27\ \text{cm}^2$ $b =$ ☐ cm

c)



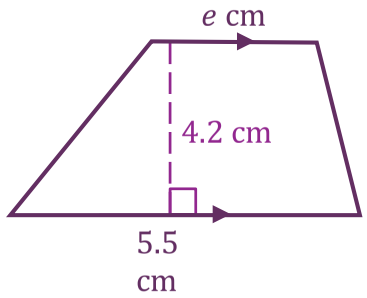
Area $= 90\ \text{cm}^2$ $c =$ ☐ cm

d)



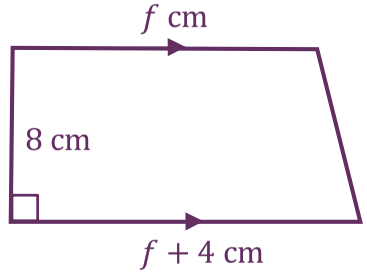
Area $= 160\ \text{cm}^2$ $d =$ ☐ cm

e)



Area $= 21\ \text{cm}^2$ $e =$ ☐ cm

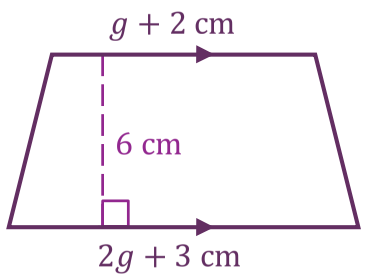
f)



Area $= 40\ \text{cm}^2$ $f =$ ☐ cm

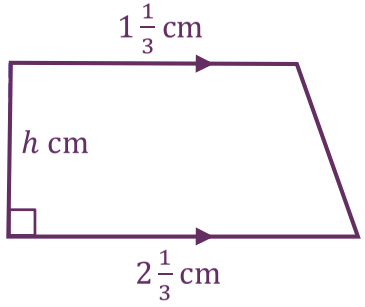
Solving Equations with... Areas of Trapeziums

g)



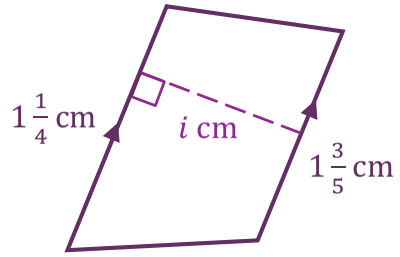
Area $= 28.5$ cm^2 $g =$ ☐ cm

h)



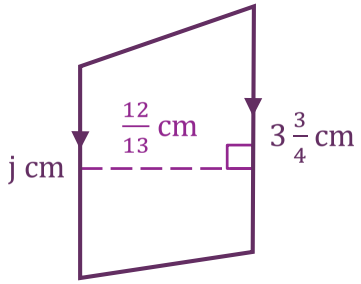
Area $= 2\frac{1}{6}$ cm^2 $h =$ ☐ cm

i)



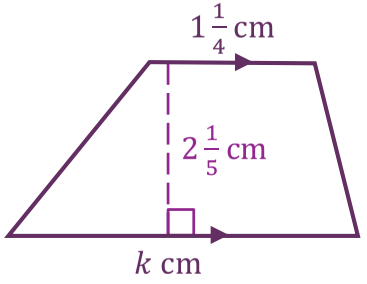
Area $= 2\frac{1}{4}$ cm^2 $i =$ ☐ cm

j)



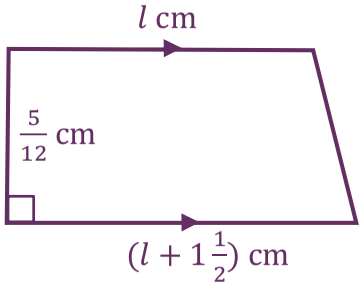
Area $= 2\frac{1}{2}$ cm^2 $j =$ ☐ cm

k)



Area $= 4\frac{1}{8}$ cm^2 $k =$ ☐ cm

l)



Area $= \frac{5}{6}$ cm^2 $l =$ ☐ cm

More-Same-Less

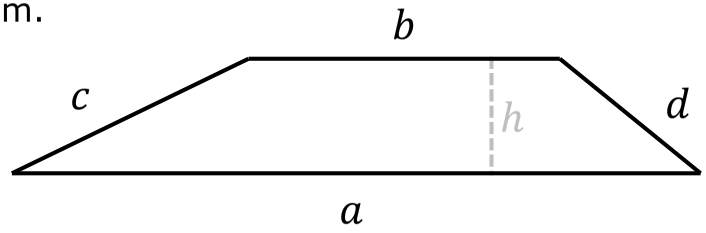
Instructions: Calculate the total area of the trapezium in the middle box. Complete the remaining boxes changing as little as possible.

Total Area

	Less	Same	More
More			
Same			
Less			

Difference between the parallel sides

Complete the table for the trapezium.

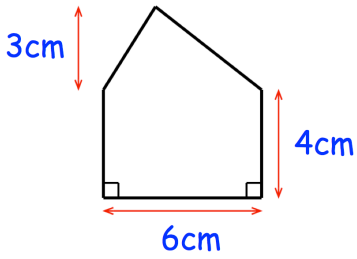


	a	b	c	d	h	Area	Perimeter
1.	6 cm	5 cm	4 cm	3 cm	2 cm		
2.	6 cm	4 cm	3 cm	2 cm	1 cm		
3.	6 cm	4 cm	5 cm		3 cm		19 cm
4.	7 cm		5 cm	7 cm	4 cm		22 cm
5.	8 cm	6 cm	4 cm	4 cm		21 cm^2	
6.	10 cm			4 cm	3 cm	24 cm^2	25 cm
7.	x cm	$x + 2$ cm	5 cm	5 cm	4 cm		24 cm
8.	x cm	$x + 2$ cm	5 cm	5 cm	4 cm	24 cm^2	
9.	x cm	$x + 2$ cm	$x + 1$ cm	$x + 3$ cm	4 cm	20 cm^2	

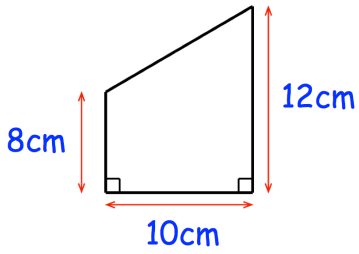
Fluency Practice

Question 3: Work out the area of each of these shapes.

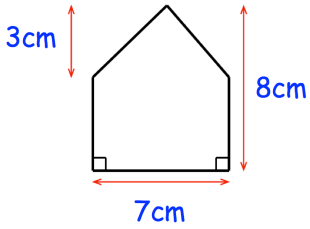
(a)



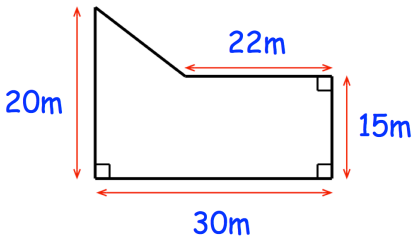
(b)



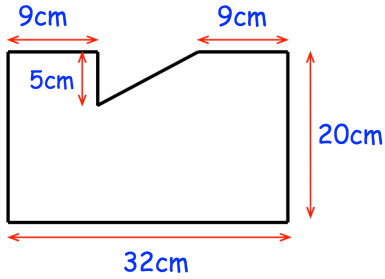
(c)



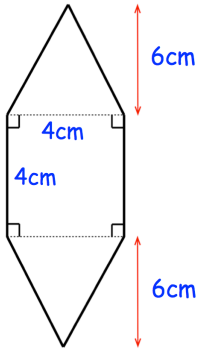
(d)



(e)

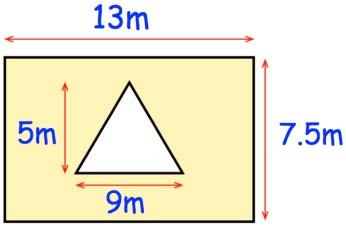


(f)

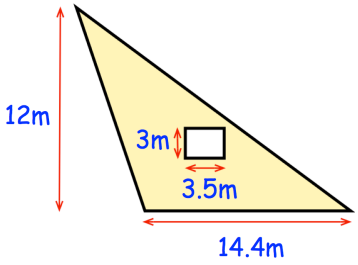


Question 4: Work out the shaded area.

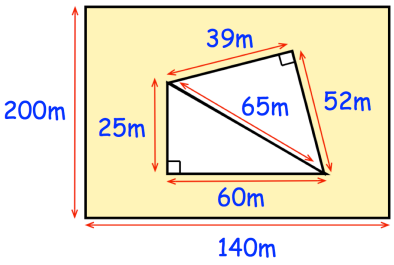
(a)



(b)

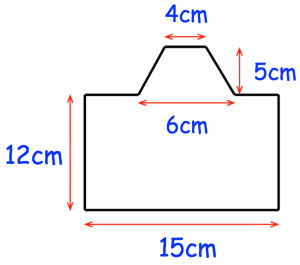


(c)

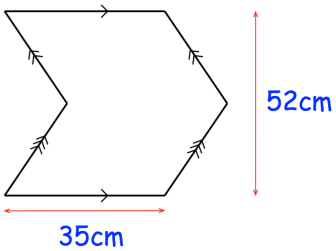


Question 5: Work out the area of each of these shapes.

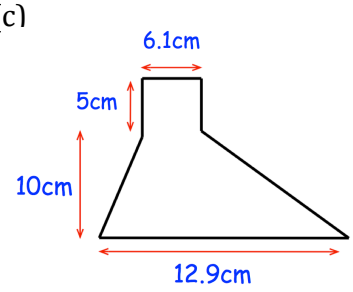
(a)



(b)



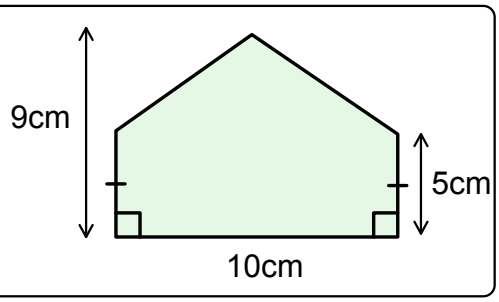
(c)



Fluency Practice

example

Calculate the area:



Area of Rectangle = $50cm^2$

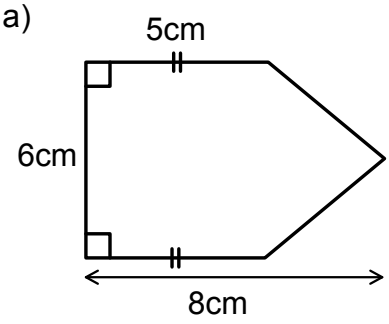
Area of triangle = $\frac{4 \times 10}{2} = 20cm^2$

Total Area = $70cm^2$

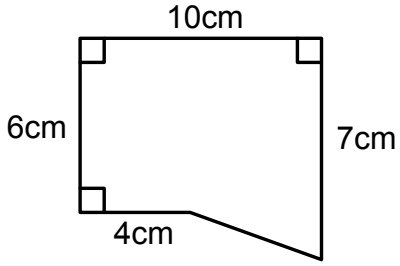
exercise 8j

1. Calculate the area:

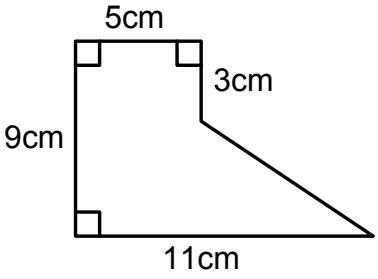
a)



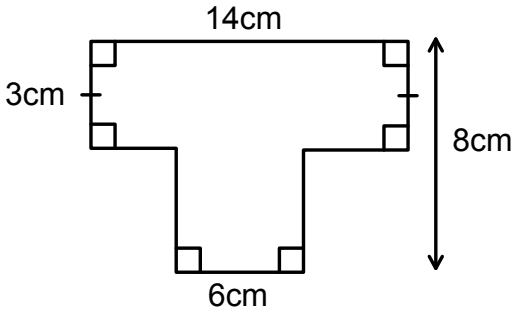
b)



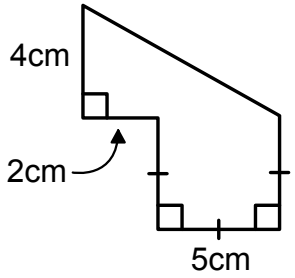
c)



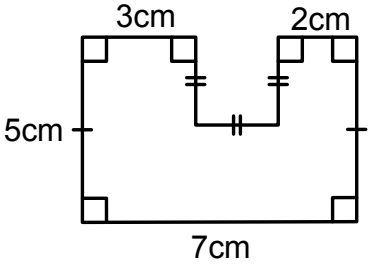
d)



e)



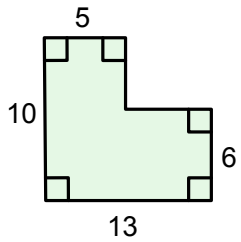
f)



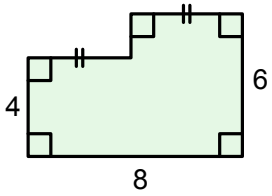
Fluency Practice

2. Calculate the area of these shapes. All the lengths are measured in cm.

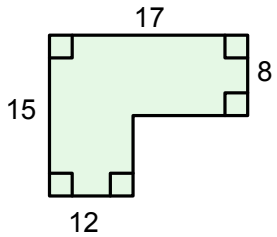
a)



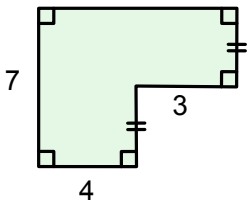
b)



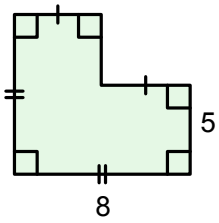
c)



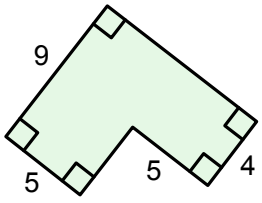
d)



e)

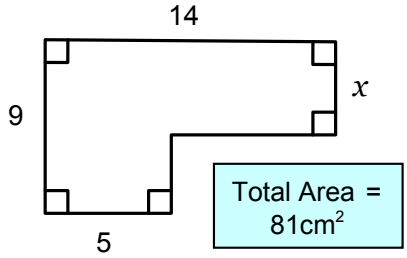


f)

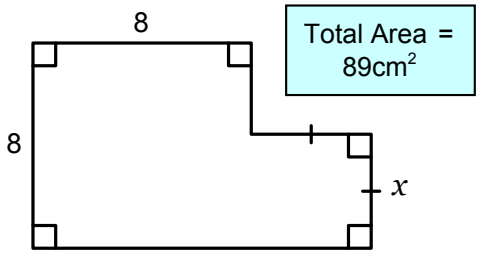


3. Calculate the missing dimensions. (All dimensions are in cm.) extra challenge

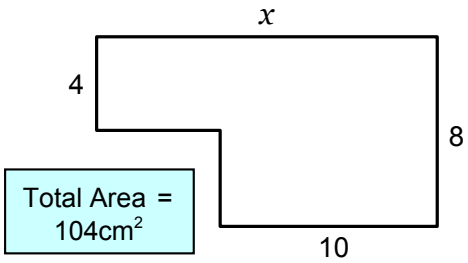
a)



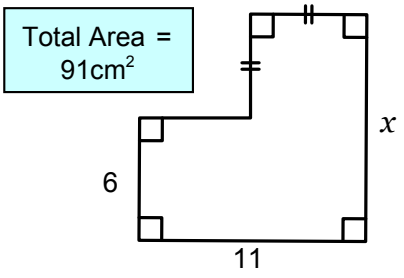
b)



c)



d)

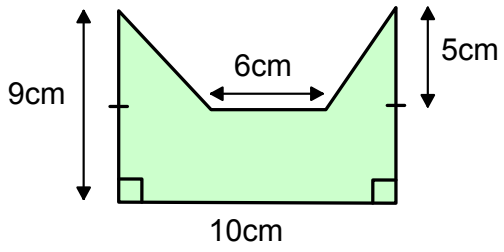


Fluency Practice

example

Calculate the area:

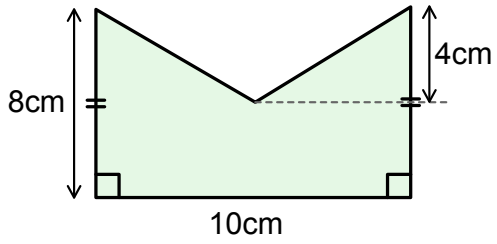
Area of Whole Rectangle = $90cm^2$
Area of Missing Trapezium =
$\frac{10+6}{2} \times 5 = 40cm^2$
Total Area = $90 - 40 = 50cm^2$



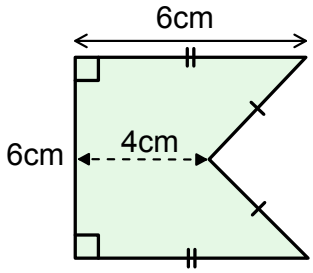
exercise 8k

1. Calculate the shaded area of each shape:

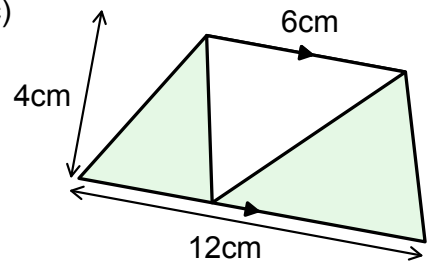
a)



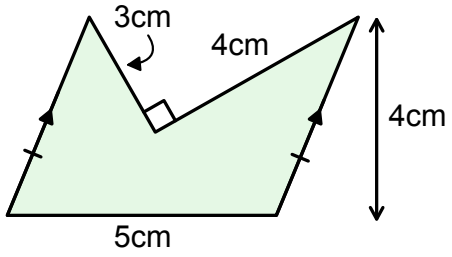
b)



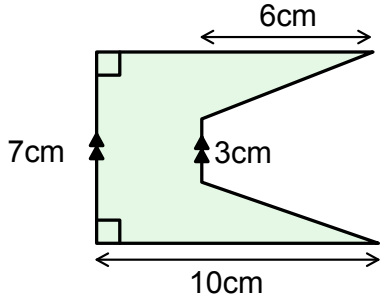
c)



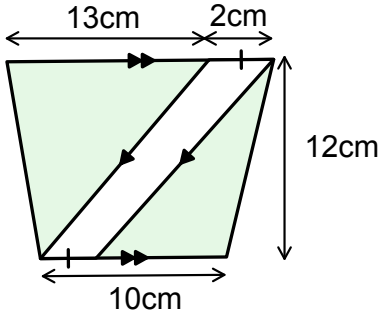
d)



e)

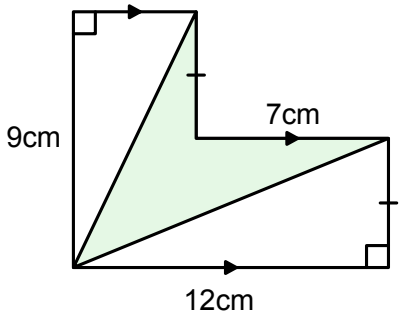


f)

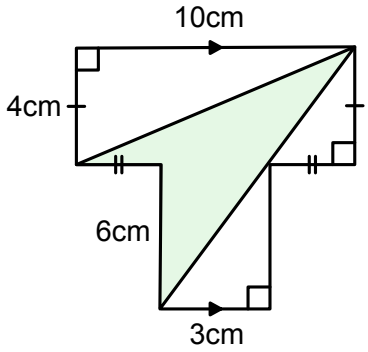


Fluency Practice

g)

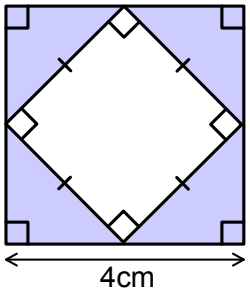


h)

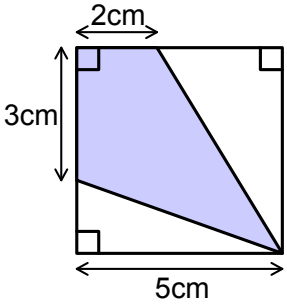


2. Each of these diagrams are squares.
Calculate the shaded area in each diagram:

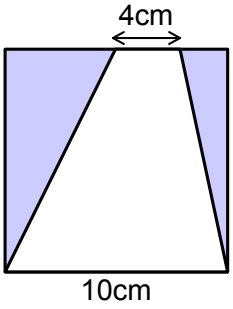
a)



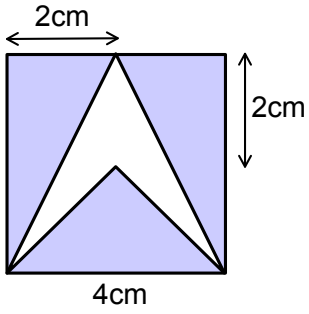
b)



c)

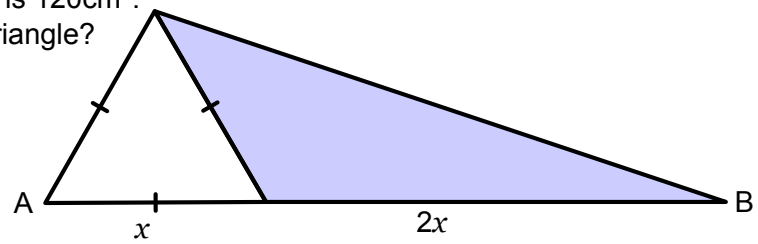


d)



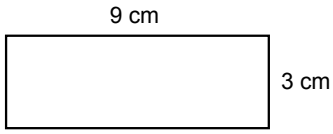
challenge

3. The line AB is a straight line.
The area of the white triangle is $120cm^2$.
What is the area of the blue triangle?

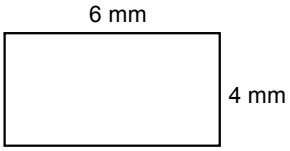


Fluency Practice

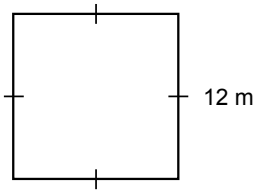
1. Calculate the area.



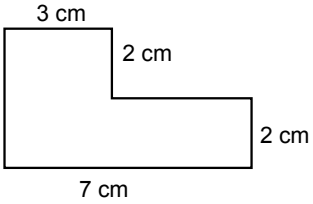
2. Calculate the perimeter.



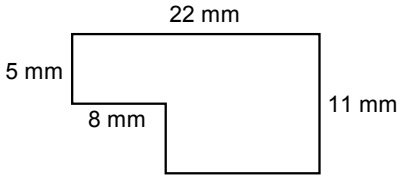
3. Calculate the area.



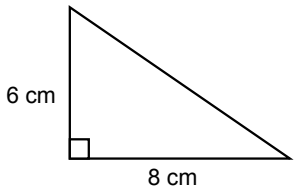
4. Calculate the perimeter.



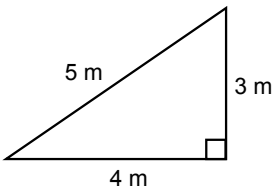
5. Calculate the area.



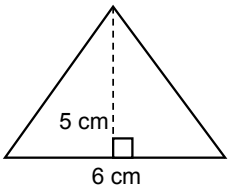
6. Calculate the area.



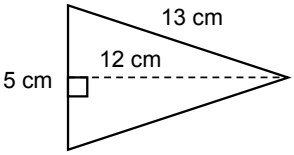
7. Calculate the perimeter.



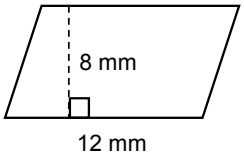
8. Calculate the area.



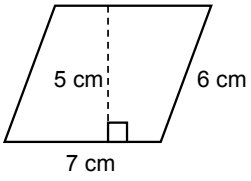
9. Calculate the area.



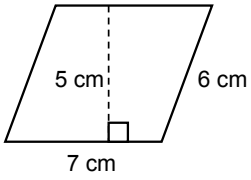
10. Calculate the area.



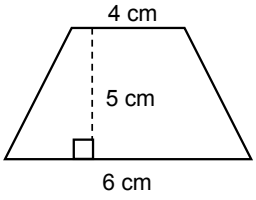
11. Calculate the area.



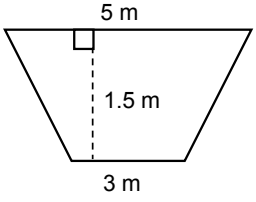
12. Calculate the perimeter.



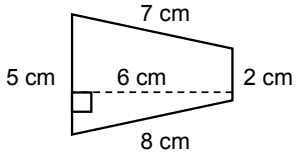
13. Calculate the area.



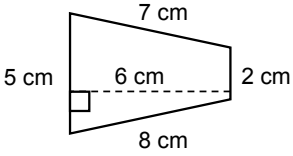
14. Calculate the area.



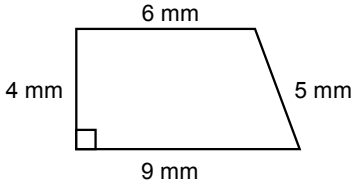
15. Calculate the perimeter.



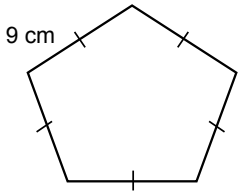
16. Calculate the area.



17. Calculate the area.

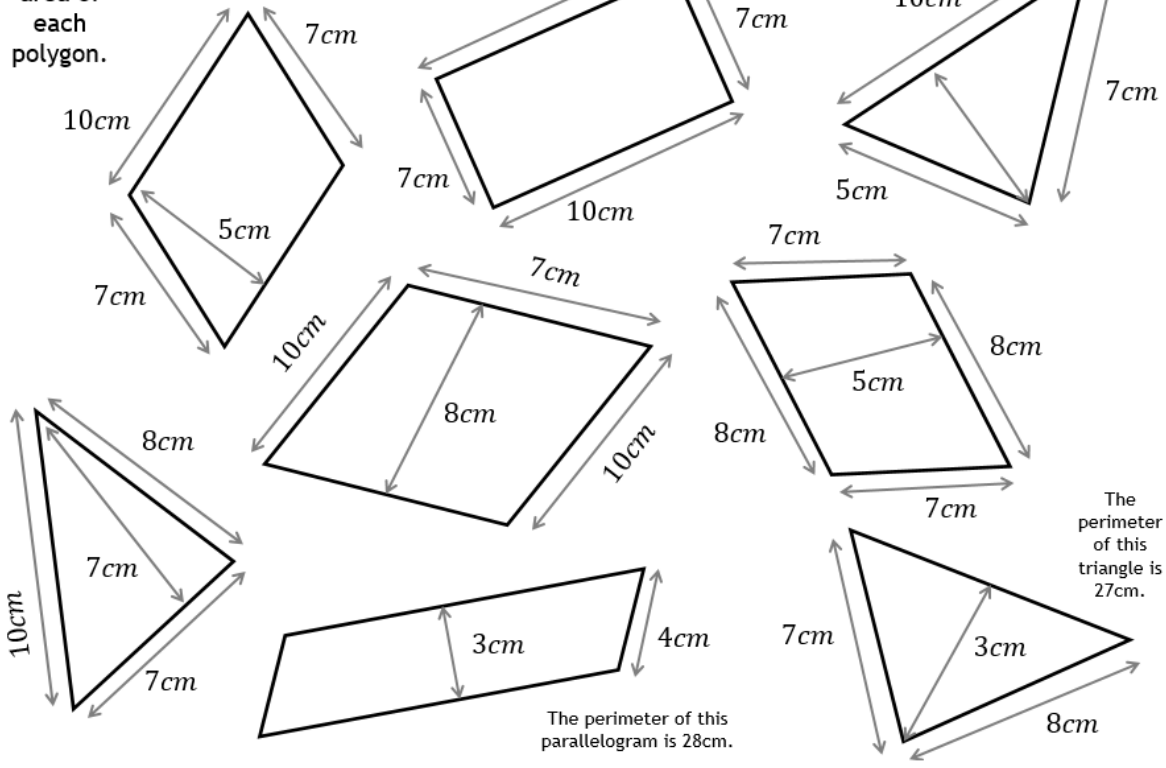


18. Calculate the perimeter.



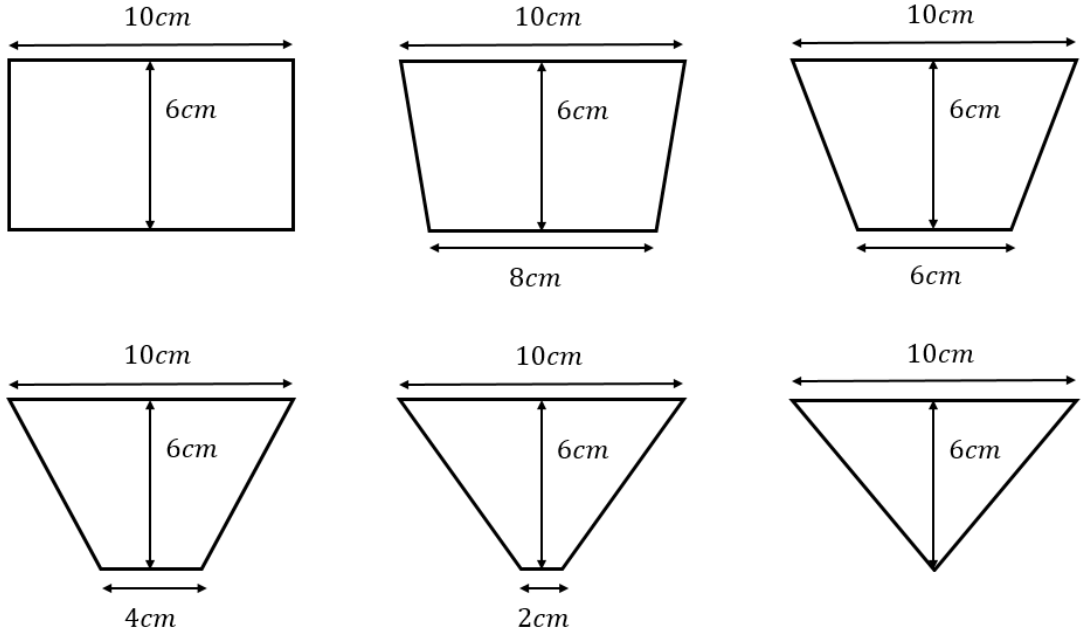
Fluency Practice

Find the area of each polygon.



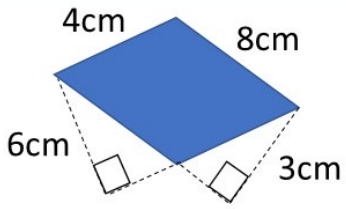
One edge of a rectangle decreases by 2cm in each question, leaving one rectangle, four trapezia and a triangle.

1) Predict how you think the area of each shape will change from question to question
2) Work out the area of each shape



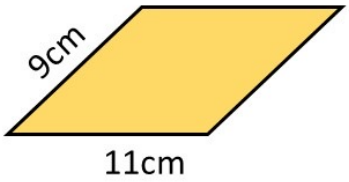
Extension

1) Find the blue parallelogram's area in two different ways.



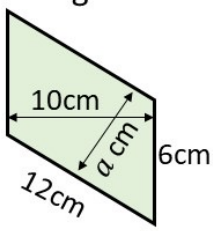
2) a) Explain why the area of this parallelogram is **not** 99cm^2

b) Will its area be greater than or less than 99cm^2? Explain how you know.

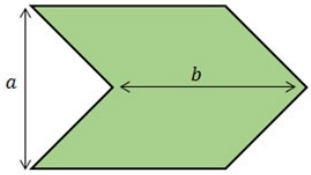


3) Draw two different parallelograms with area 24cm^2 and perimeter 22cm.

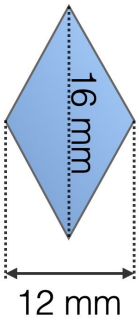
4) This shape is a parallelogram. Find the value of a.



5) This shape is made from two parallelograms. Explain why its area is ab

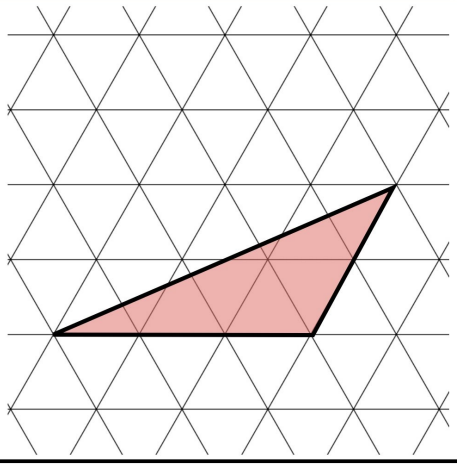


Find the area of this rhombus.

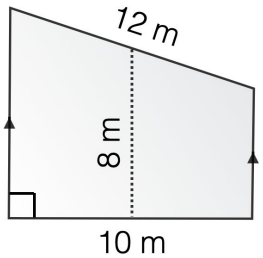


Here is a grid made up of equilateral triangles. Each small triangle has an area of 5 cm^2.

What is the area of the shaded triangle?



Find the area of this trapezium. The dashed line segment joins the midpoints of the 10 m and 12 m edges shown.

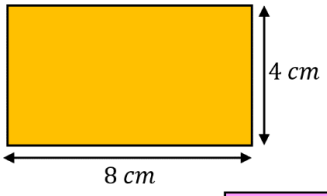


Can you find the perimeter of this trapezium?

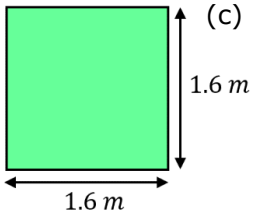
Fluency Practice

Find the area and perimeter of each of these shapes.

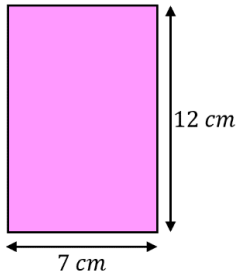
(a)



(b)

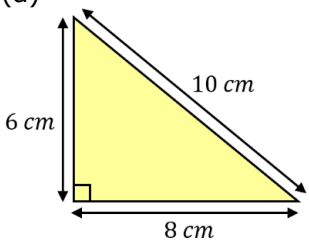


(c)

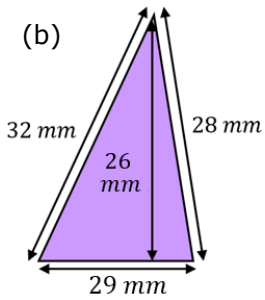


Find the area and perimeter of each of these shapes.

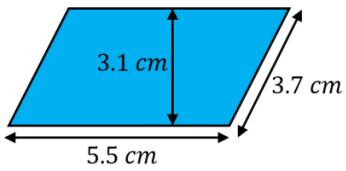
(a)



(b)

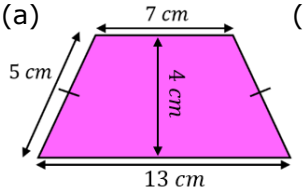


(c)

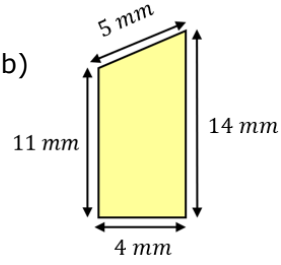


Find the area and perimeter of each of these shapes.

(a)



(b)

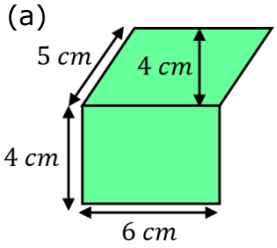


A rectangle has an area of $32\ cm^2$ and its length and width are both integers. What is the largest perimeter it could have?

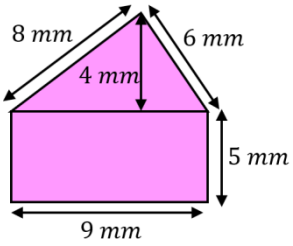
Fluency Practice

Find the area and perimeter of these compound shapes.

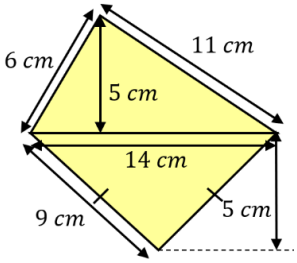
(a)



(b)

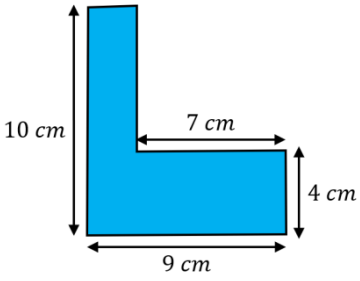


(c)

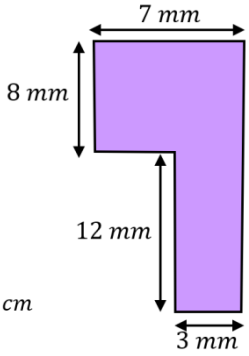


Find the area and perimeter of these compound shapes.

(a)

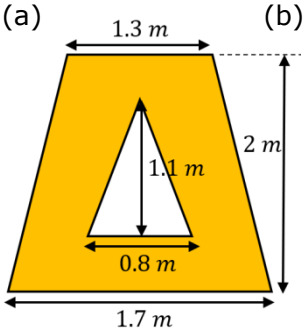


(b)

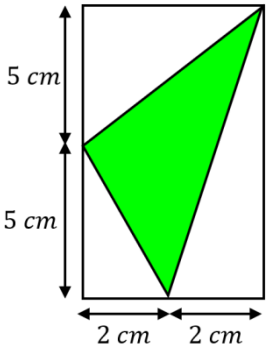


Find the area of the shaded shapes.

(a)

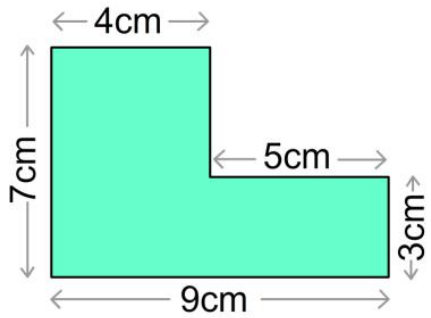


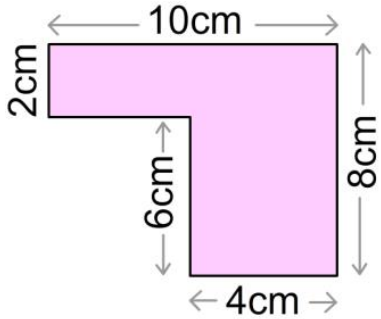
(b)

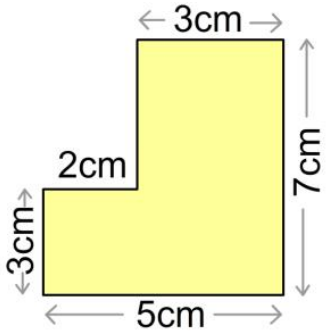


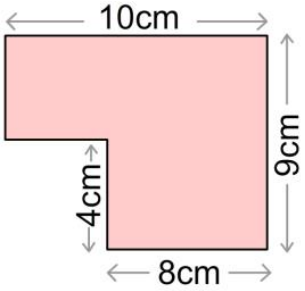
Fluency Practice

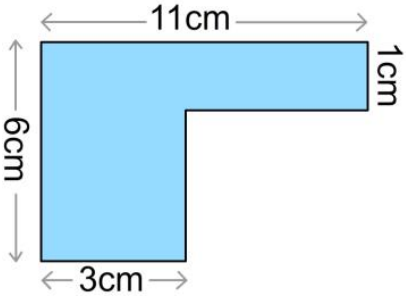
These shapes are made of smaller shapes put together. Can you work out their total area?

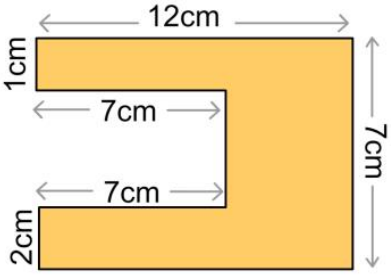




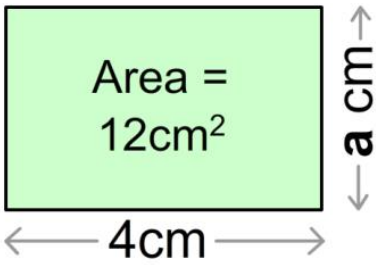


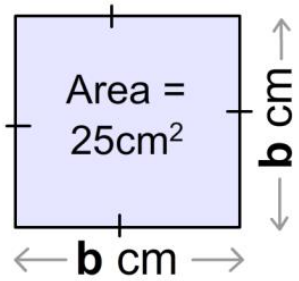


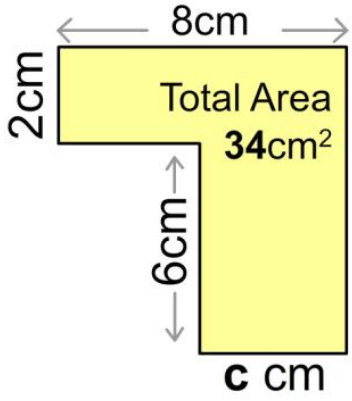


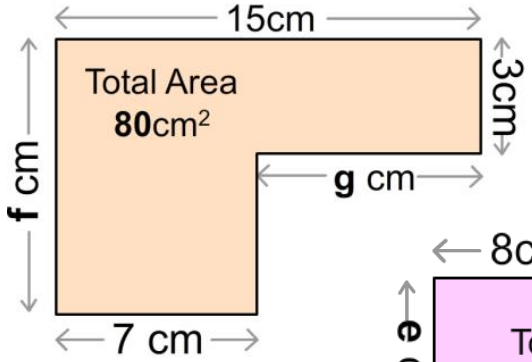


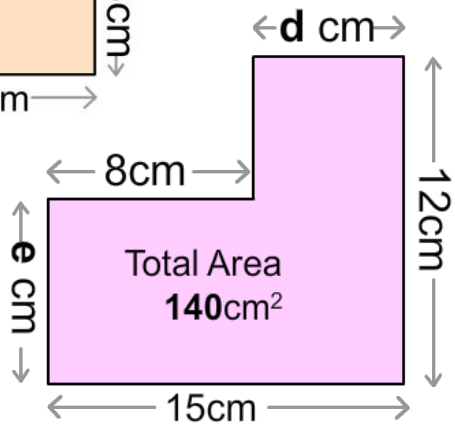
The area of each of these shapes is shown. Can you work out the missing side lengths?

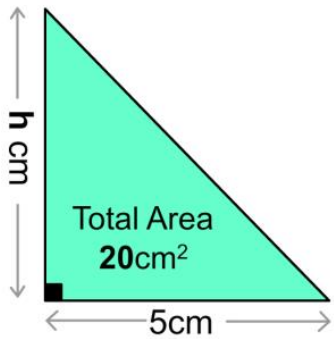






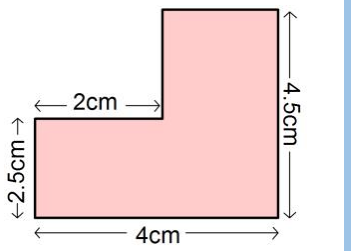


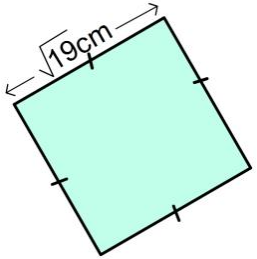


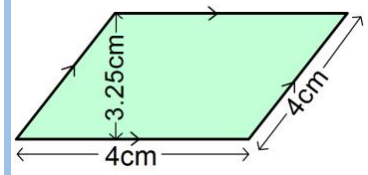


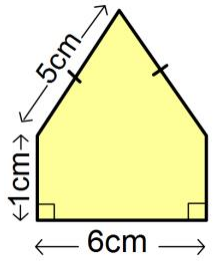
area magic square

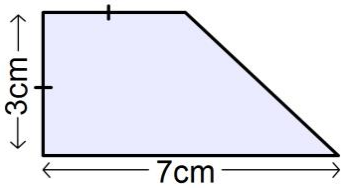
Arrange the shapes so that each row, column and diagonal has the same total area.

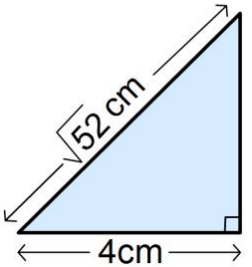


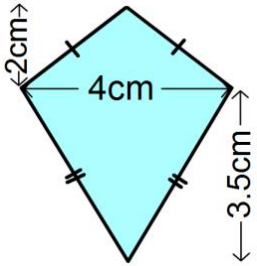


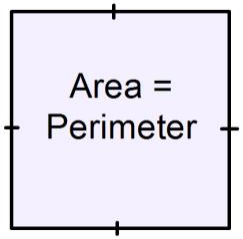


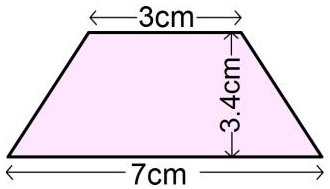






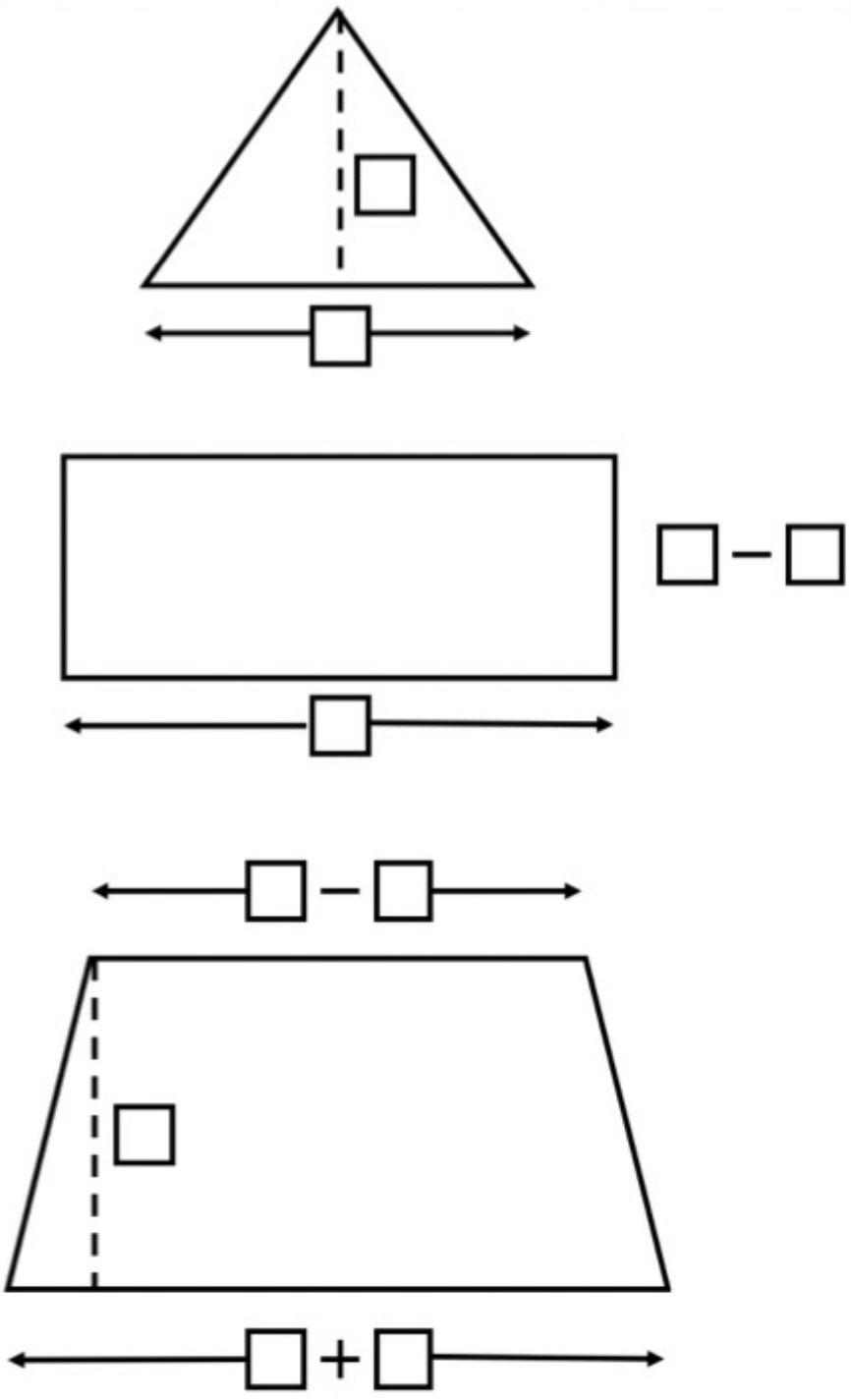




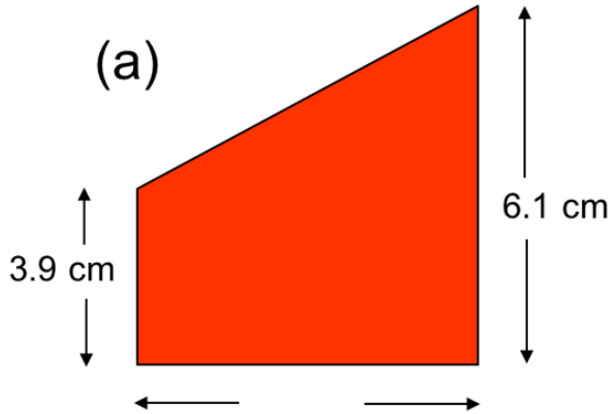


Problem Solving

The shapes below have the same area. Fill in the gaps using only the numbers 1 to 10. You can only use each number once.



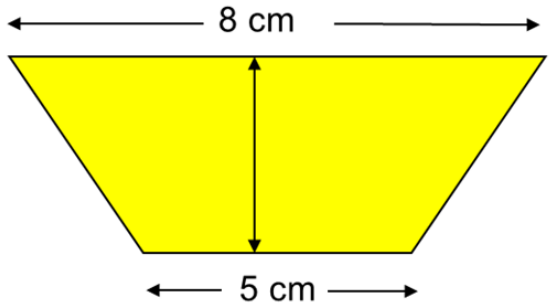
(a)



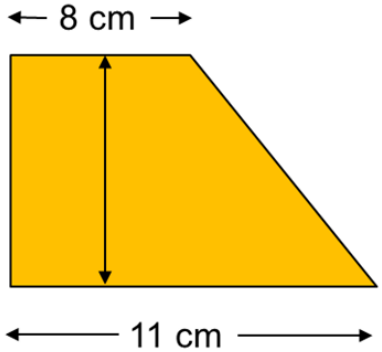
the trapeziums have areas that are consecutive numbers

what are the missing (integer) dimensions?

(b)

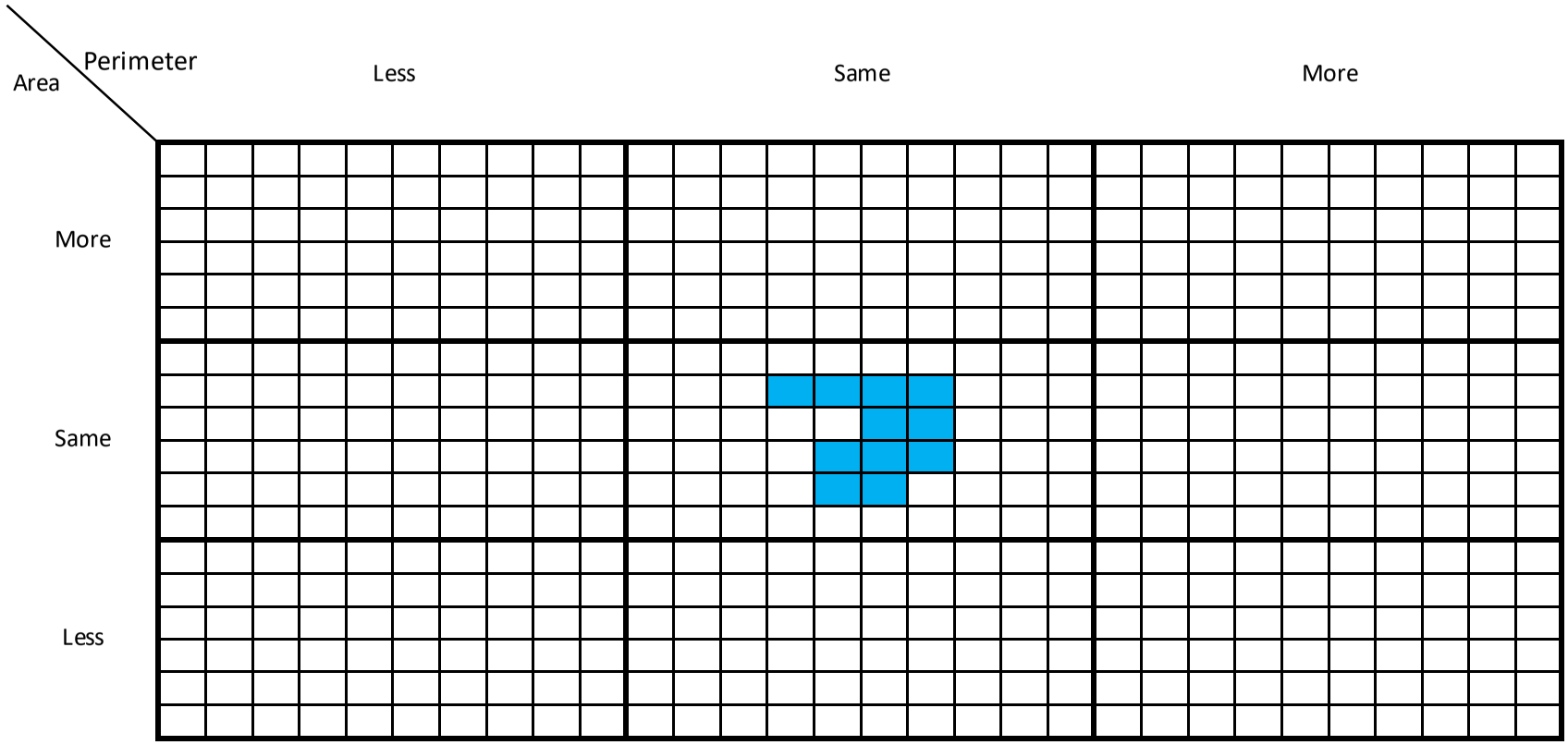


(c)



the three consecutive areas sum to a number that is the sum of two square numbers

More-Same-Less



Instructions: Complete the remaining boxes, by making the minimum change possible to the centre box. If there are boses that cannot be filled in, say why.

More-Same-Less

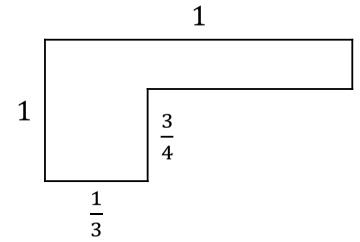
Instructions: Complete the remaining boxes with different rectangles by making the minimum change possible to the centre box. If there are boxes that cannot be filled in, say why.

Perimeter \ Area	Less	Same	More
More			
Same		8cm, 3cm, $Area = 24cm^2$	
Less			

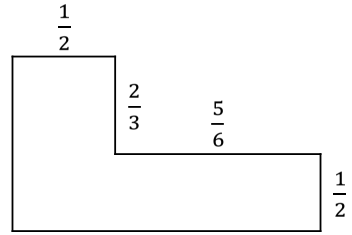
L-shapes with... Fractions

Find the area and perimeter of each shape.

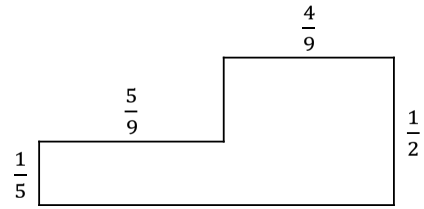
a



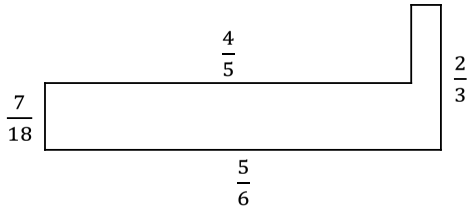
b



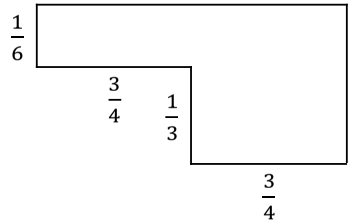
c



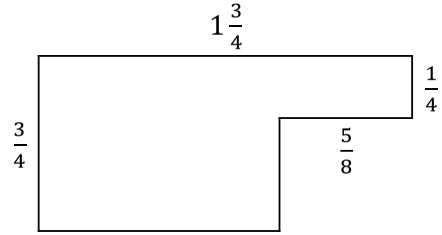
d



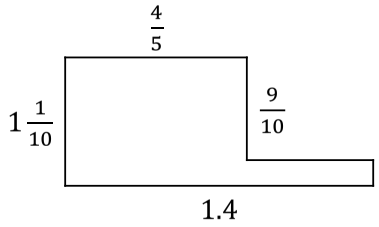
e



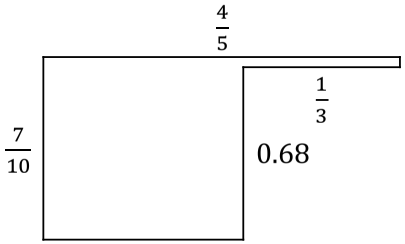
f



g



h



i