KING EDWARD VI
HANDSWORTH GRAMMAR
SCHOOL FOR BOYS

KING EDWARD VI
ACADEMY TRUST
BIRMINGHAM

Year 7
2023 Mathematics 2024
Unit 4 Booklet

HGS Maths

Tasks

Dr Frost Course

Name: _____

Class: _____

Contents

1 Rounding

1.1 Midpoint of Two Numbers
1.2 Rounding to the Nearest Multiple
1.3 Rounding to Decimal Places
1.4 Rounding to Significant Figures

2 Metric Units

2.1 Metric Units of Length
2.2 Metric Units of Mass
2.3 Metric Units of Capacity
2.4 Metric Units of Time

3 Properties of 2D Shapes

3.1 Names of 2D Shapes
3.2 Line Symmetry
3.3 Rotational Symmetry
3.4 Types and Properties of Triangles
3.5 Types and Properties of Quadrilaterals

4 Area and Perimeter

4.1 Perimeter on a Grid
4.2 Perimeter
4.3 Area on a Grid
4.4 Area of Rectangles
4.5 Area of Rectilinear Shapes
4.6 Area of Parallelograms
4.7 Area of Triangles
4.8 Area of Trapeziums
4.9 Area of Compound Shapes without Circles

1 Rounding

1.1 Midpoint of Two Numbers

Worked Example	Your Turn
Find the midpoint of -5 and 6	Find the midpoint of -6 and 5

1.2 Rounding to the Nearest Multiple

Worked Example	Your Turn
Round 63 to the nearest: a) 10 b) 2 c) 3	Round 65 to the nearest: a) 10 b) 2 c) 3

1.3 Rounding to Decimal Places

Worked Example	Your Turn
Round 8.7337 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places	Round 8.3773 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places

Worked Example	Your Turn
Round 0.0337 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places	Round 0.0377 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places

Worked Example	Your Turn
Round 8.7997 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places	Round 7.8998 to: a) 1 decimal place b) 2 decimal places c) 3 decimal places

1.4 Rounding to Significant Figures

Worked Example

Circle the 2nd significant figure:

7 8 0 0

7 0 0 8

7 . 0 0 8

0 . 0 0 7 8

0 . 7 0 0 8

Your Turn

Circle the 2nd significant figure:

1) 4 5 6

2) 4 0 6

3) 4 0 0

4) 4 0 0 0

5) 4 5 0 0

6) 4 5 0 6

7) 4 5 . 0 6

8) 4 . 5 0 6

9) 0 . 4 5 0 6

10) 0 . 0 4 5 0 6

11) 0 . 0 0 4 5 0 6

12) 0 . 0 0 4 0 0 6

13) 3 . 0 0 4 0 0 6

14) 0 . 3 0 4 0 0 6

Worked Example

1) 8 Number of significant figures $=$

2) 0.8 Number of significant figures $=$

3) 800 Number of significant figures $=$

4) 0.800 Number of significant figures $=$

5) 0.008 Number of significant figures $=$

Your Turn

1) 456 Number of significant figures =
2) 450 Number of significant figures =
3) 406 Number of significant figures =
4) 400 Number of significant figures =
5) 40 Number of significant figures =
6) 4 Number of significant figures =
7) 0.4 Number of significant figures =
8) 0.40 Number of significant figures =
9) 0.04 Number of significant figures =
10) 0.004 Number of significant figures =
11) 0.00456 Number of significant figures =
12) 0.456 Number of significant figures =
13) 0.406 Number of significant figures =
14) 0.450 Number of significant figures =
15) 0.4500 Number of significant figures =
16) 0.45006 Number of significant figures =
17) 0.450067 Number of significant figures =
18) 450067 Number of significant figures =
19) 45067 Number of significant figures =
20) 4506.7 Number of significant figures =
21) 450.67 Number of significant figures =
22) 45.067 Number of significant figures =
23) 45.0067 Number of significant figures =
24) 4.50067 Number of significant figures =
25) 4.00067 Number of significant figures =
26) 0.00067 Number of significant figures =
27) 0.0067 Number of significant figures =
28) 6.0007 Number of significant figures =
29) 0.6007 Number of significant figures =
30) 0.0607 Number of significant figures =

Worked Example	Your Turn
Round 271828 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures	Round 738906 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures

Worked Example	Your Turn
Round 2.71828 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures	Round 7.38906 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures

Worked Example	Your Turn
Round 0.00271828 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures	Round 0.00738906 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures

Worked Example	Your Turn
Round 0.00279999 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures	Round 0.00739999 to: a) 1 significant figure b) 2 significant figures c) 3 significant figures

2 Metric Units

Conversions

Unit of measurement	Useful conversions	Examples – what would usually be measured in these units?
Distance		
Millimetres (mm)		
Centimetres (cm)		
Metres (m)		
Kilometres (km)		
Weight		
Grams (g)		
Kilograms (kg)		
Tonnes (T)		
Capacity		
Millilitres (ml)		
Litres (l)		

2.1 Metric Units of Length

The commonly used metric units of length include:

- kilometre (km)
- metre (m)
- centimetre (cm)
- millimetre (mm)

Worked Example	Your Turn
Convert 3.54 kilometres into: a) metres b) centimetres c) millimetres	Convert 5.3 kilometres into: a) metres b) centimetres c) millimetres

Worked Example	Your Turn
Convert 3.54 metres into: a) kilometres b) centimetres c) millimetres	Convert 5.3 metres into: a) kilometres b) centimetres c) millimetres

Worked Example	Your Turn
Convert 3.54 centimetres into: a) kilometres b) metres c) millimetres	Convert 5.3 centimetres into: a) kilometres b) metres c) millimetres

Worked Example	Your Turn
Convert 3.54 millimetres into: a) kilometres b) metres c) centimetres	Convert 5.3 millimetres into: a) kilometres b) metres c) centimetres

2.2 Metric Units of Mass

The commonly used metric units of mass include:

- tonne (T)
- kilogram (kg)
- gram (g)

Worked Example	Your Turn
Convert 3.54 tonnes into: a) kilograms b) grams	Convert 5.3 tonnes into: a) kilograms b) grams

Worked Example	Your Turn
Convert 3.54 kilograms into: a) grams b) tonnes	Convert 5.3 kilograms into: a) grams b) tonnes

Worked Example	Your Turn
Convert 3.54 grams into: a) kilograms b) tonnes	Convert 5.3 grams into: a) kilograms b) tonnes

2.3 Metric Units of Capacity

The commonly used metric units of capacity include:

- litre (l)
- centilitre (cl)
- millilitre (ml)

Worked Example	Your Turn
Convert 3.54 litres into: a) millilitres b) centilitres	Convert 5.3 litres into: a) millilitres b) centilitres

Worked Example	Your Turn
Convert 3.54 millilitres into: a) litres b) centilitres	Convert 5.3 millilitres into: a) litres b) centilitres

Worked Example	Your Turn
Convert 3.54 centilitres into: a) millilitres b) litres	Convert 5.3 centilitres into: a) millilitres b) litres

2.4 Metric Units of Time

The commonly used metric units of time include:

- second (s)
- minute (min)
- hour (hr)

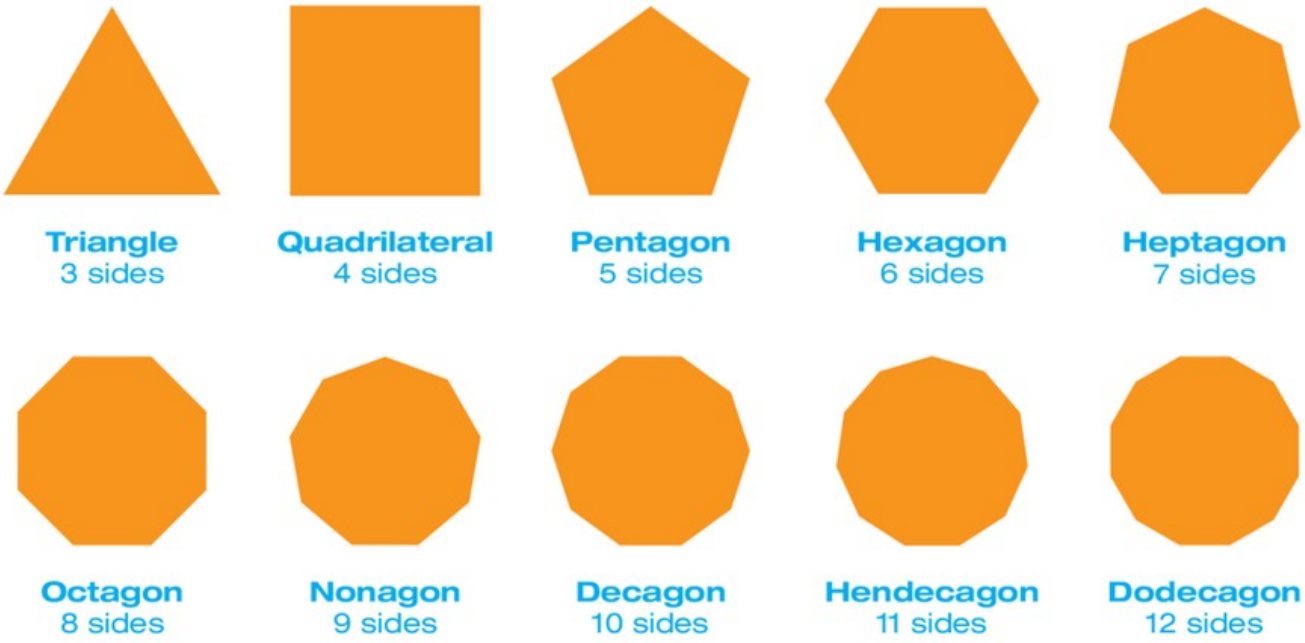
Worked Example	Your Turn
a) Sam play cards for 7 hours and 42 minutes. Write this duration in minutes. b) Luke play cards for 521 minutes Write this duration in hours and minutes.	a) Lacey play cards for 8 hours and 37 minutes. Write this duration in minutes. b) Ellie play cards for 414 minutes. Write this duration in hours and minutes.

Worked Example	Your Turn
a) Lorrie eats for 12 minutes and 19 seconds. Write this duration in seconds. b) Lily eats for 504 seconds. Write this duration in seconds.	a) Latika eats for 6 minutes and 28 seconds. Write this duration in seconds. b) Mike eats for 374 seconds.. Write this duration in seconds.

Worked Example	Your Turn
a) Simon leaves home at 3 59 pm. Simon arrives at 5 13 pm. How long was the journey? b) James leaves home at 6 32 pm. The journey takes 113 minutes. Work out at what time does James arrive.	a) Simon leaves home at 3 38 pm. Simon arrives at 6 20 pm. How long was the journey? b) James leaves home at 8 02 pm. The journey takes 88 minutes. Work out at what time does James arrive.

3 Properties of 2D Shapes

3.1 Names of 2D Shapes



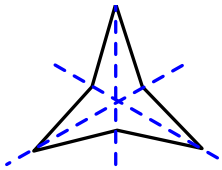
3.2 Line Symmetry

Fluency Practice

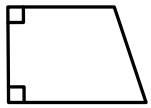
learn by heart

If a shape is reflected through a **line of symmetry**, the result is the same shape.

If you fold a shape through a line of symmetry, the two halves fit perfectly over each other.



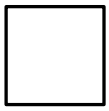
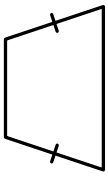
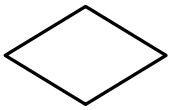
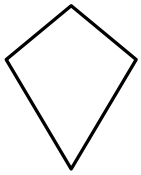
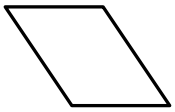
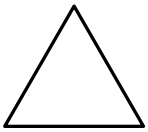
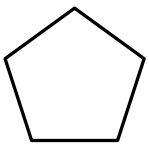
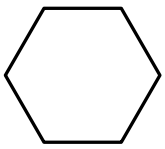
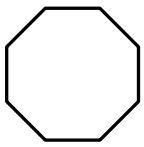
This shape has **3** lines of symmetry.



A right-angled trapzium has **0** lines of symmetry.

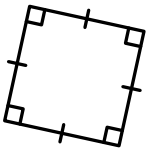
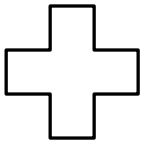
exercise 3d

1. Draw in all of the lines of symmetry for each shape, and state how many there are:

				
Square	Isosceles Trapezium	Rhombus	Kite	Rectangle
				
Parallelogram	Equaliteral Triangle	Regular Pentagon	Regular Hexagon	Regular Octagon

2. A triangle has exactly one line of symmetry.
   What is the name for this type of triangle?

3. Which **one** of the following shapes **does not have 4 lines of symmetry**?

P	Q	R	S
			

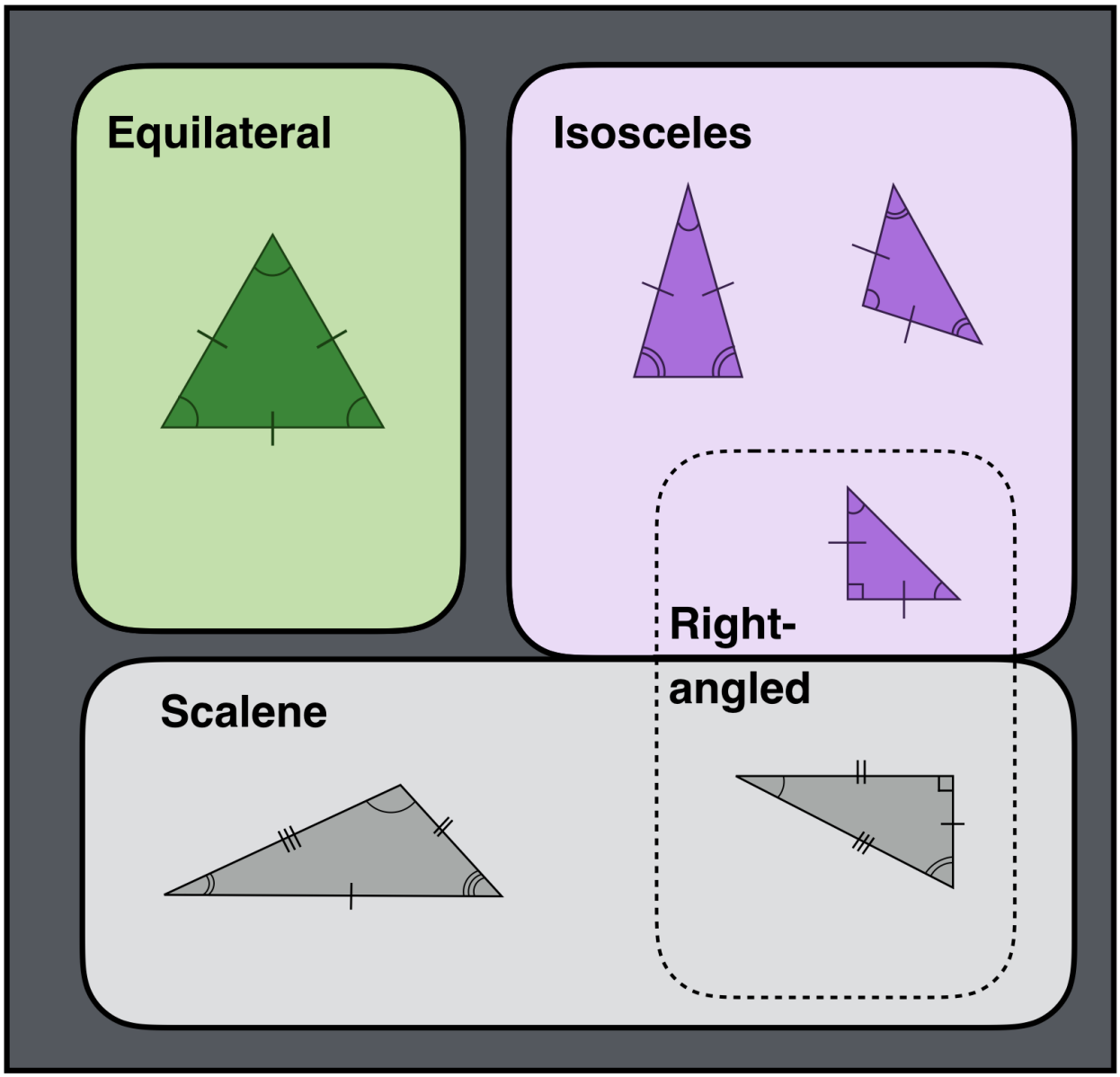
4. Sort these letters into the correct groups, based on their lines of symmetry:

A C E F H L M N P S T Z

No lines of symmetry	1 line of symmetry	2 lines of symmetry

3.3 Rotational Symmetry

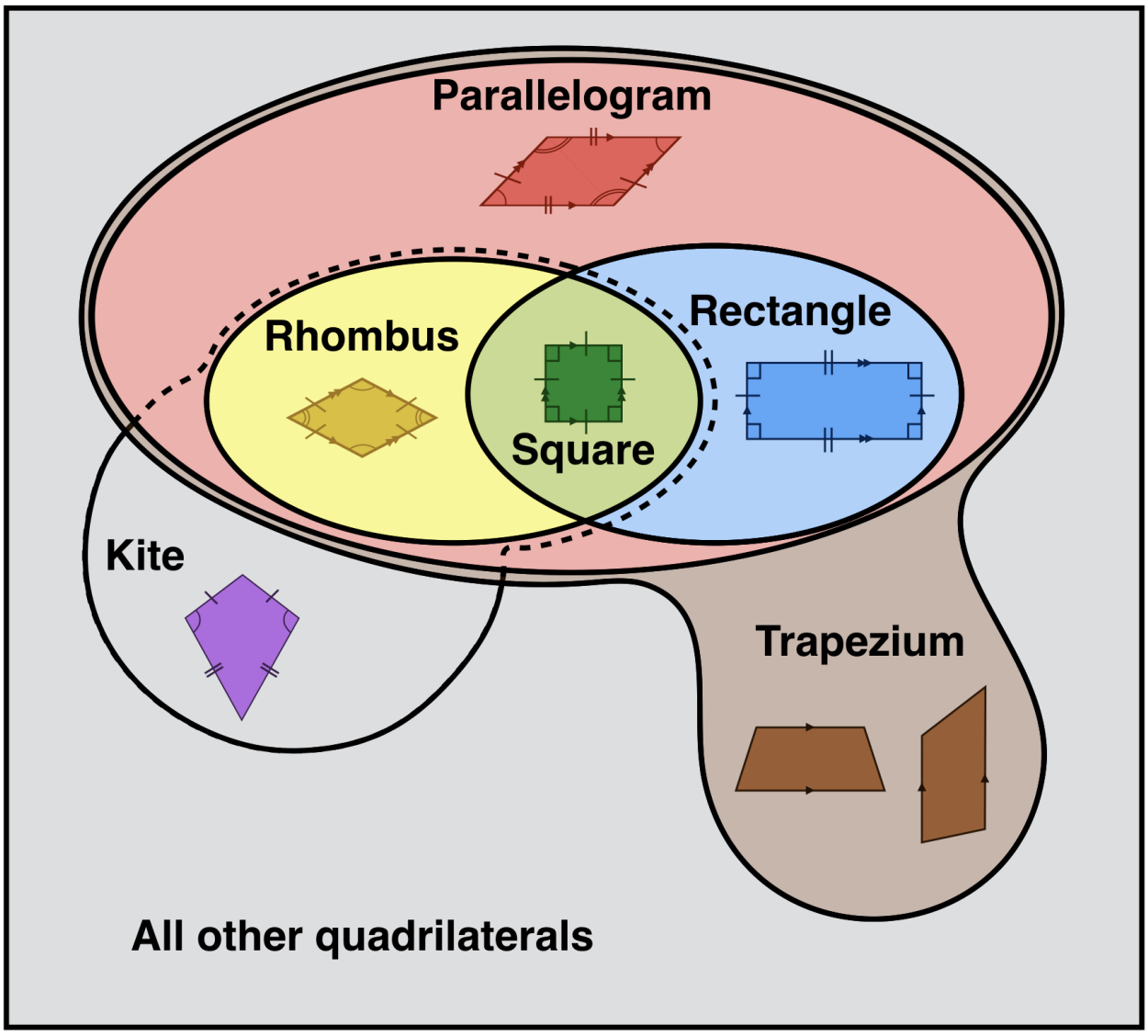
3.4 Types and Properties of Triangles



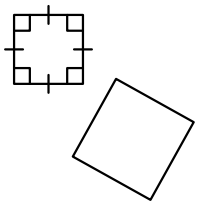
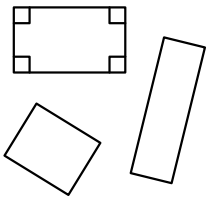
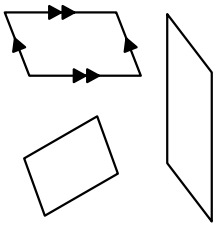
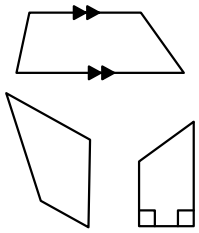
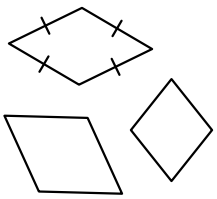
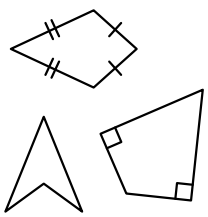
Types and Properties of Triangles

Name	Examples	Properties
Equilateral		
Isosceles		
Scalene		
Right-Angled		

3.5 Types and Properties of Quadrilaterals

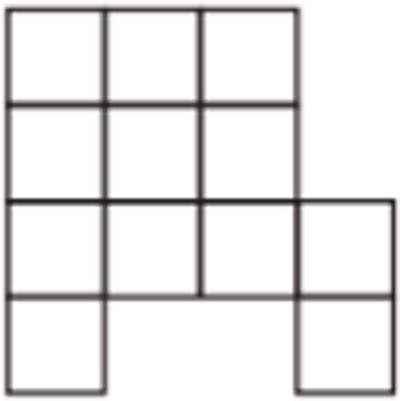
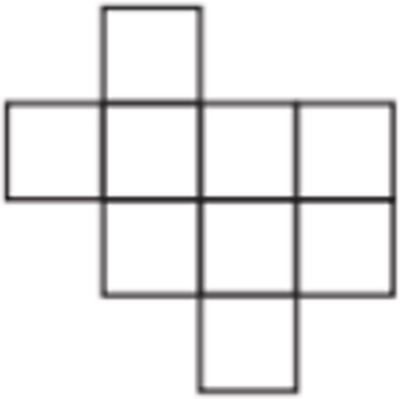


Types and Properties of Quadrilaterals

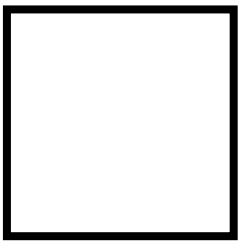
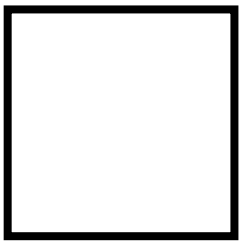
Name	Examples	Properties	Diagonals
Square			
Rectangle			
Parallelogram			
Trapezium			
Rhombus			
Kite			

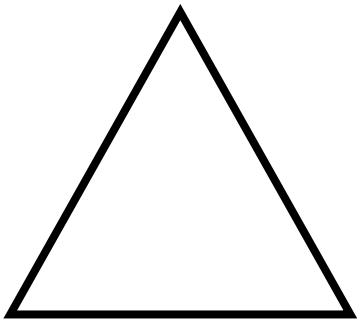
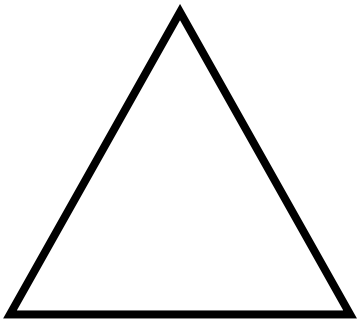
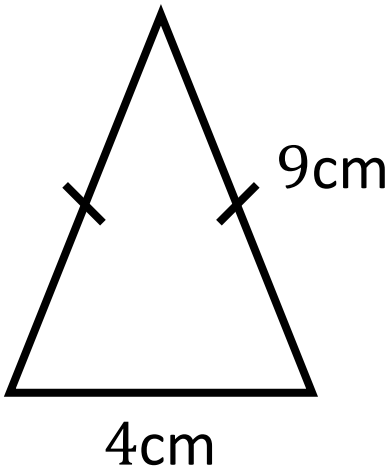
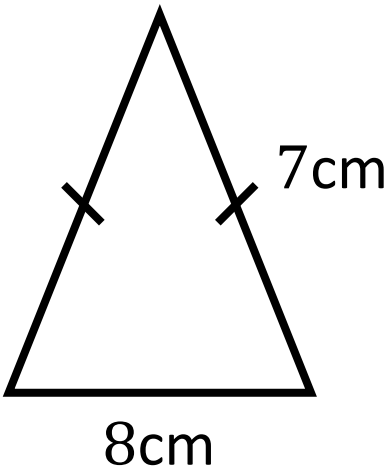
4 Area and Perimeter

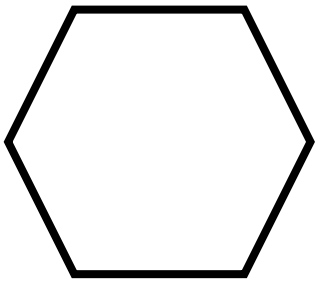
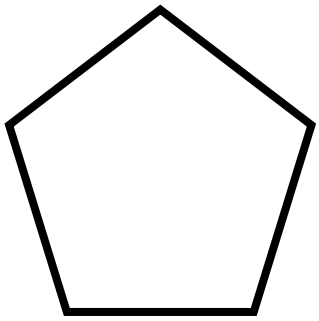
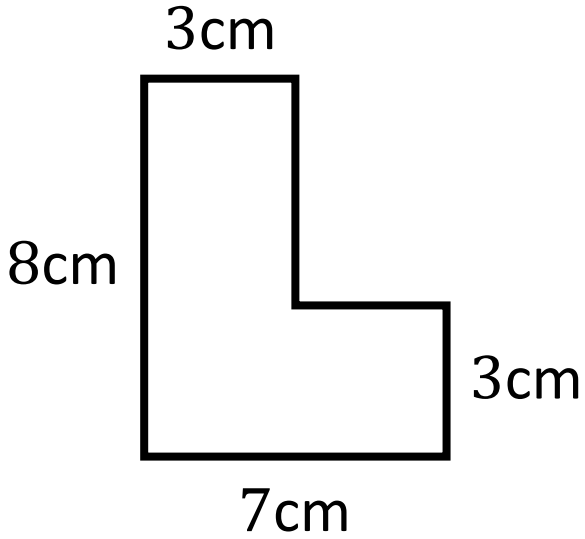
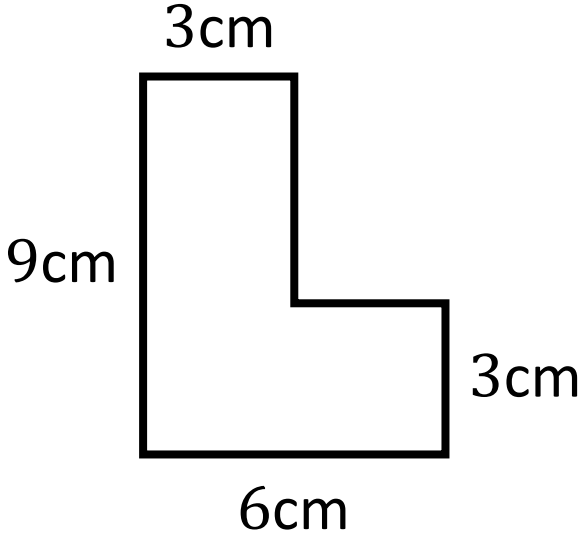
4.1 Perimeter on a Grid

Worked Example	Your Turn
Calculate the perimeter of the shape below: 	Calculate the perimeter of the shape below: 

4.2 Perimeter

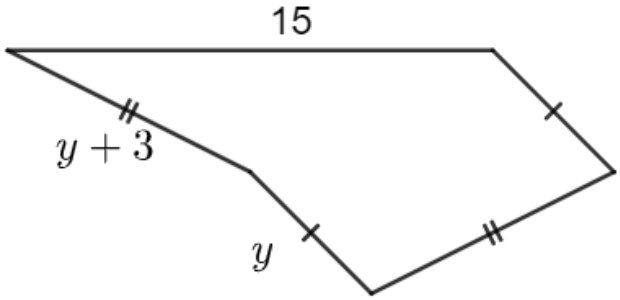
Worked Example	Your Turn
Calculate the perimeter of the rectangle: 6cm  2cm	Calculate the perimeter of the rectangle: 12cm  4cm
Calculate the perimeter of the square: 3cm 	Calculate the perimeter of the square: 6cm 

Worked Example	Your Turn
Calculate the perimeter of the equilateral triangle:  	Calculate the perimeter of the equilateral triangle: 
Calculate the perimeter of the isosceles triangle:  	Calculate the perimeter of the isosceles triangle: 

Worked Example	Your Turn
Calculate the perimeter of the regular hexagon:  	Calculate the perimeter of the regular pentagon: 
Calculate the perimeter of the shape below:  	Calculate the perimeter of the shape below: 

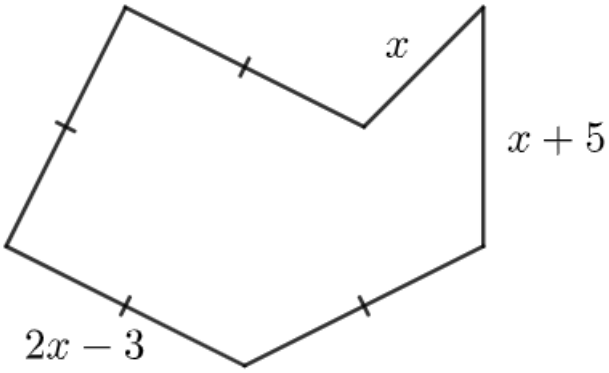
Worked Example

Find an expression for the perimeter of the following shape:



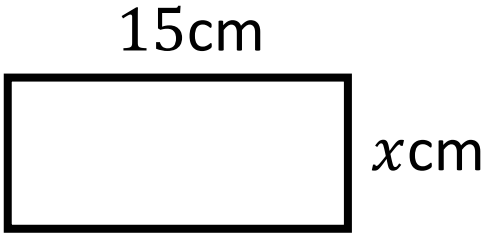
Your Turn

Find an expression for the perimeter of the following shape:



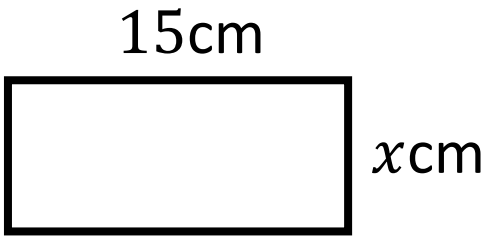
Worked Example

Calculate the length of x if the perimeter of the rectangle is 44cm:

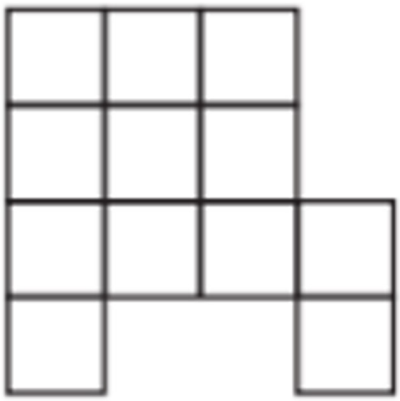
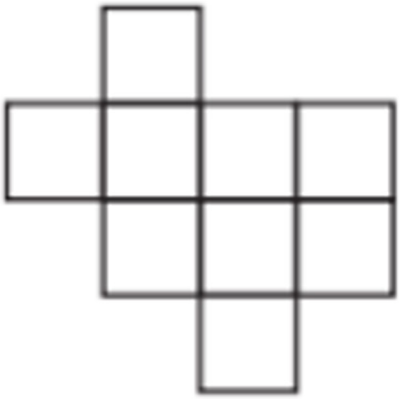


Your Turn

Calculate the length of x if the perimeter of the rectangle is 88cm:



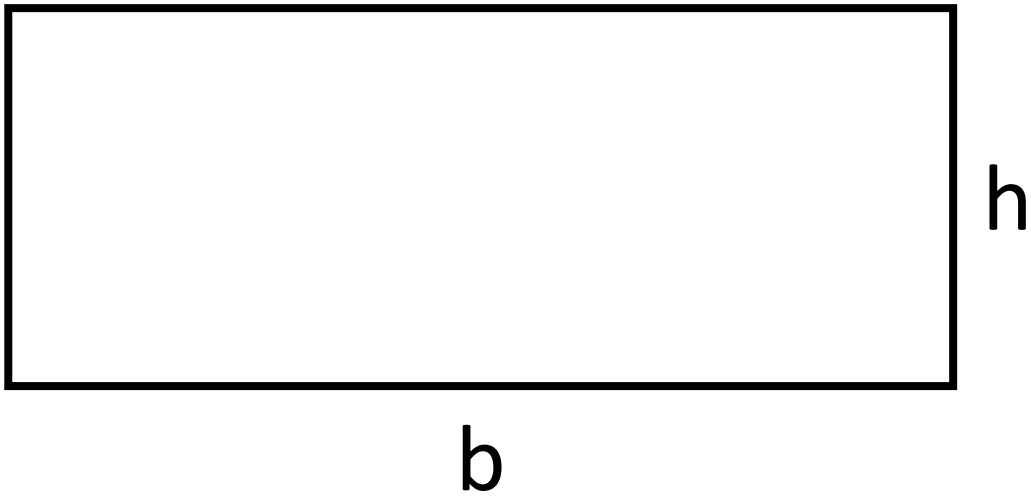
4.3 Area on a Grid

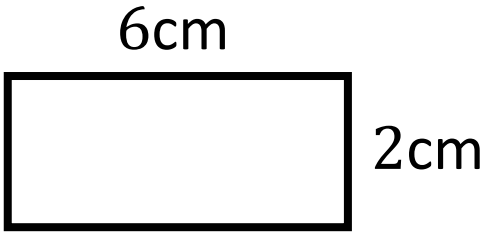
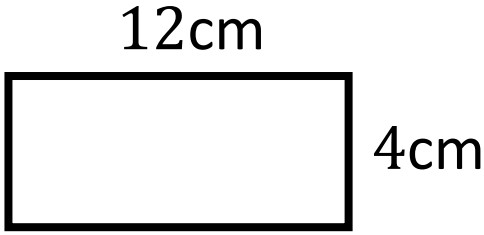
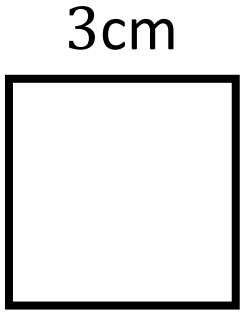
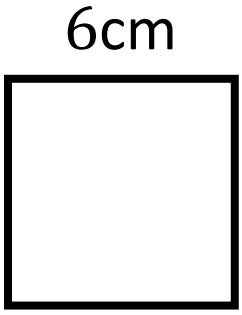
Worked Example	Your Turn
Calculate the area of the shape below: 	Calculate the area of the shape below: 

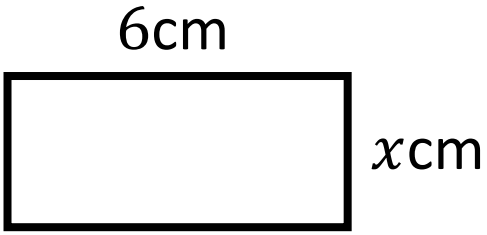
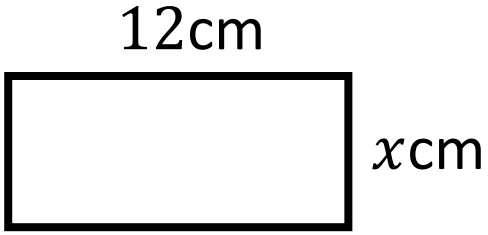
4.4 Area of Rectangles

Area = base x height

A = b x h

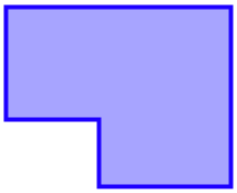


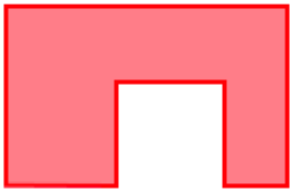
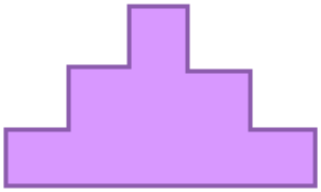
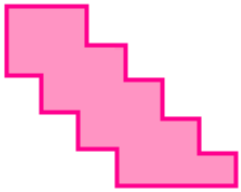
Worked Example	Your Turn
Calculate the area of the rectangle:  	Calculate the area of the rectangle: 
Calculate the area of the square:  	Calculate the area of the square: 

Worked Example	Your Turn
Calculate x if the area of the rectangle is 12cm^2:  	Calculate x if the area of the rectangle is 48cm^2: 

4.5 Area of Rectilinear Shapes

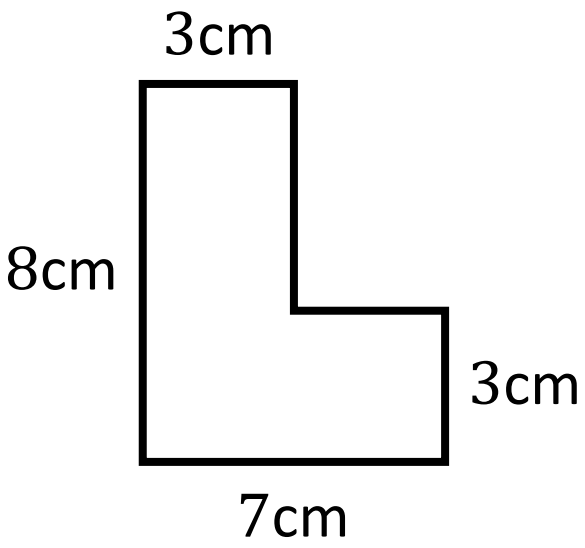
A rectilinear shape is one whose edges all meet at right angles.

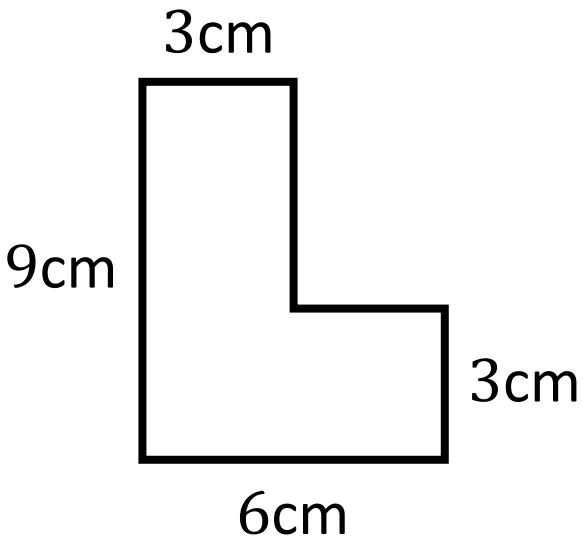
Worked Example

Calculate the area of the shape below:



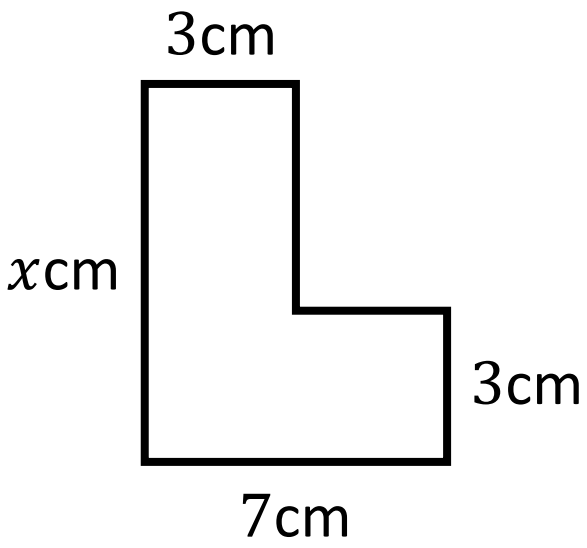
Your Turn

Calculate the area of the shape below:



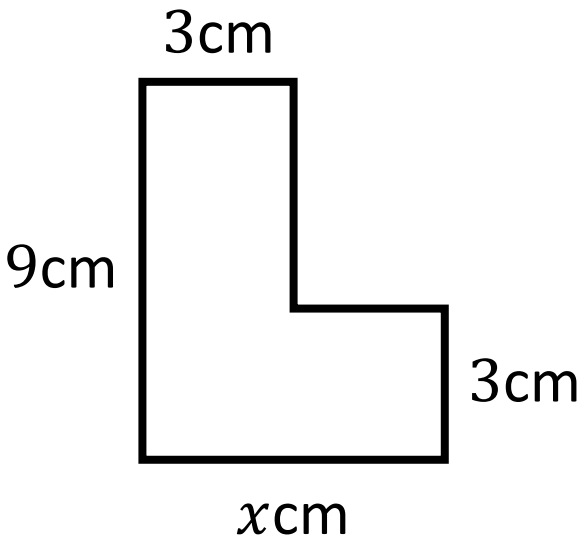
Worked Example

The area of the shape below is 36 cm^2. Find x.



Your Turn

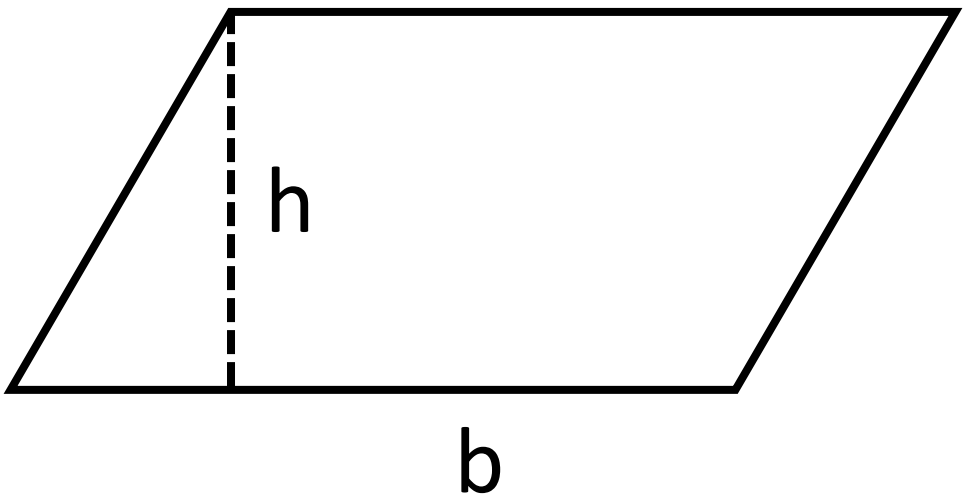
The area of the shape below is 36 cm^2. Find x.



4.6 Area of Parallelograms

Area of a parallelogram = base x perpendicular height

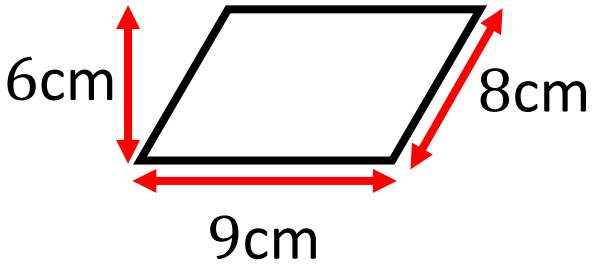
$A = b \times h$



The two lengths used in the formula need to be **perpendicular**.

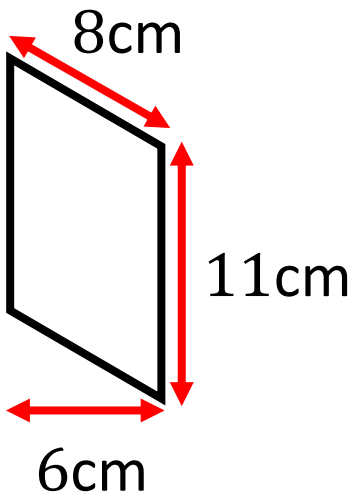
Worked Example

Calculate the area of the parallelogram:



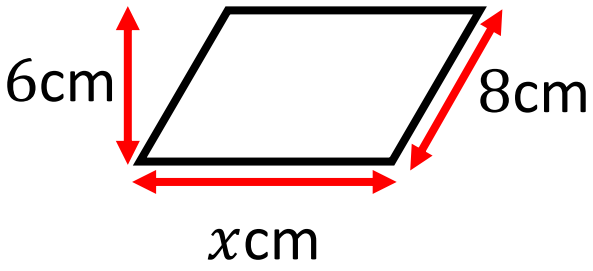
Your Turn

Calculate the area of the parallelogram:



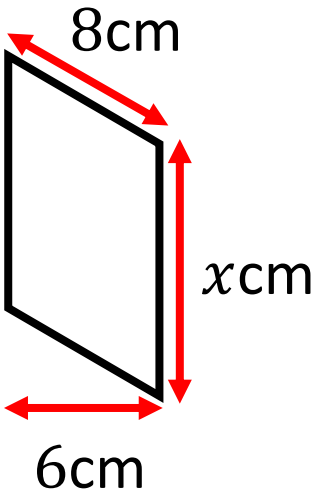
Worked Example

Calculate x if the area of the parallelogram is 54cm^2:



Your Turn

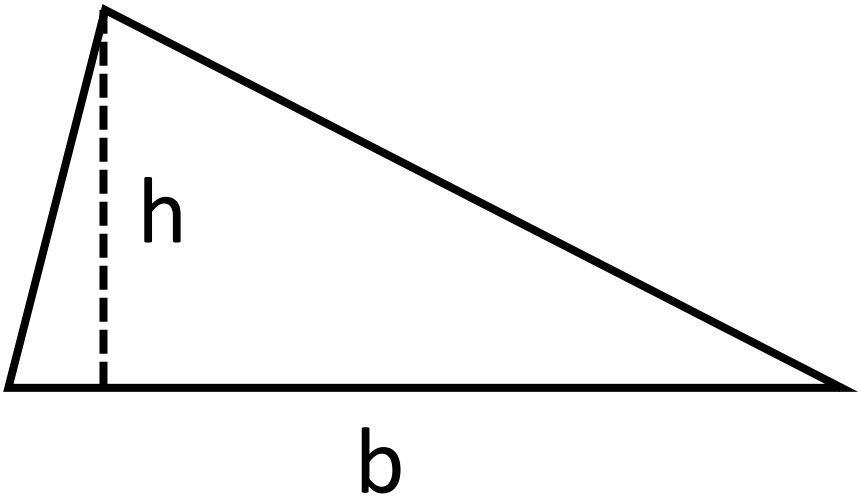
Calculate x if the area of the parallelogram is 66cm^2:

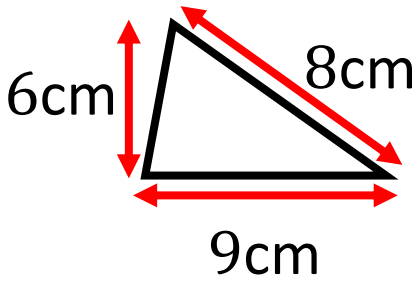
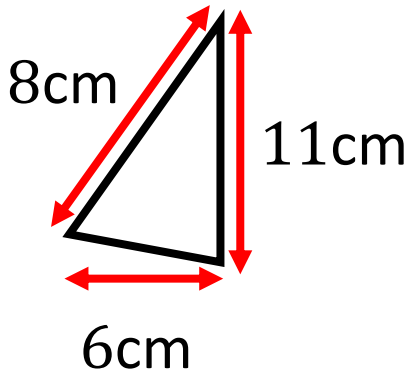


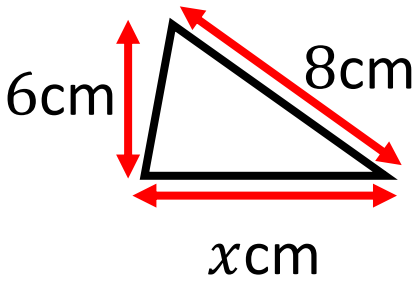
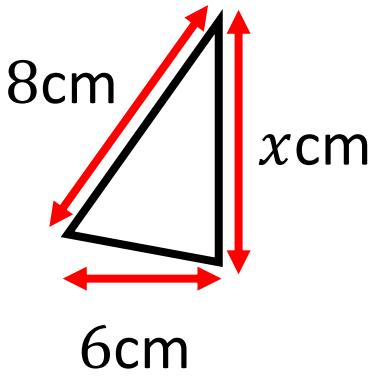
4.7 Area of Triangles

$$\text{Area of a triangle} = \frac{\text{base x perpendicular height}}{2}$$

$$A = \frac{b \times h}{2}$$



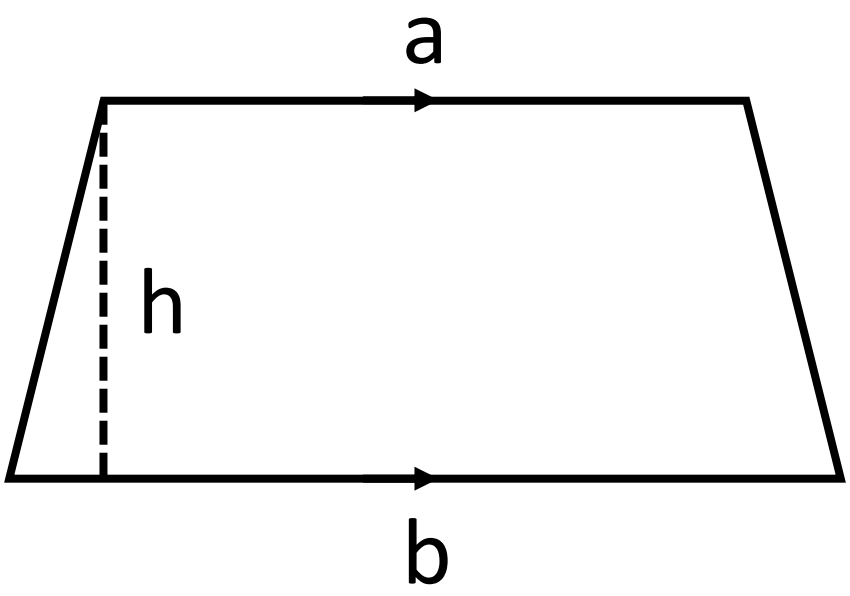
Worked Example	Your Turn
Calculate the area of the triangle:  	Calculate the area of the triangle: 

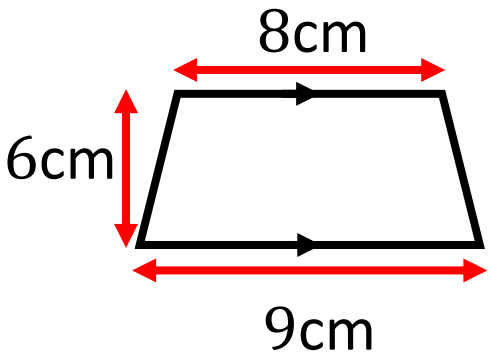
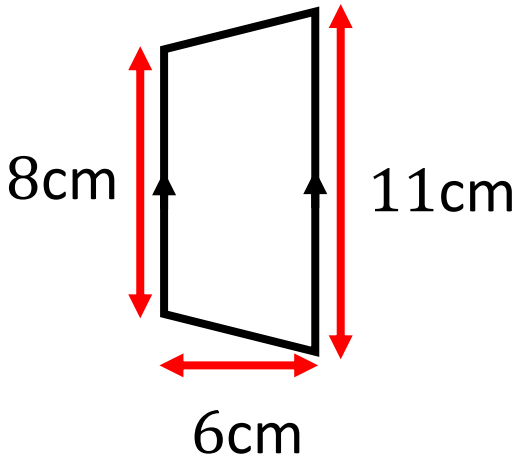
Worked Example	Your Turn
Calculate x if the area of the triangle is 27cm^2: 	Calculate x if the area of the triangle is 33cm^2: 

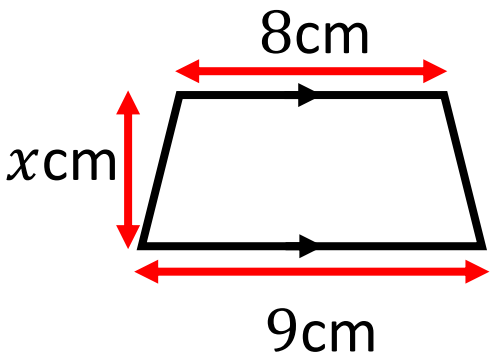
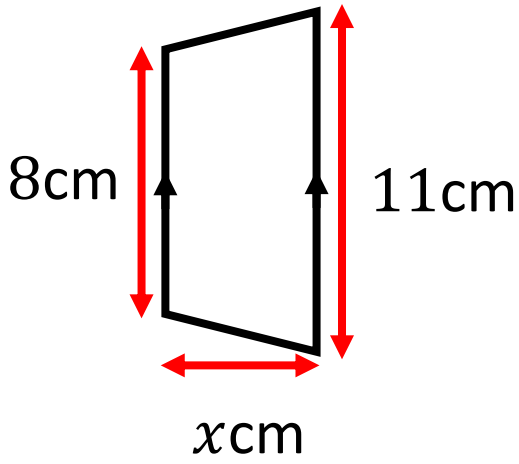
4.8 Area of Trapeziums

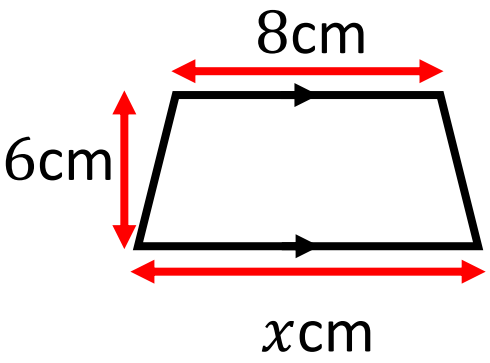
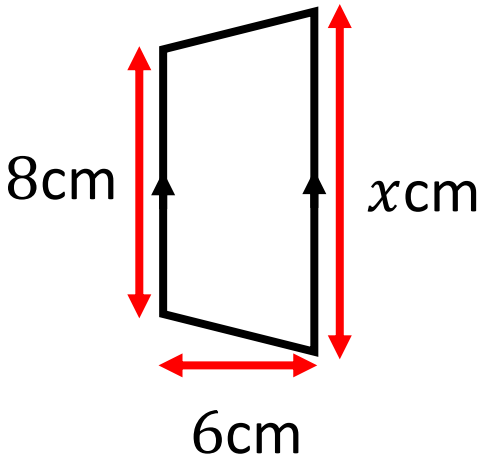
$$\text{Area of a trapezium} = \frac{\text{sum of parallel sides}}{2} \text{ x perpendicular height}$$

$$A = \frac{a+b}{2} \times h$$



Worked Example	Your Turn
Calculate the area of the trapezium:  	Calculate the area of the trapezium: 

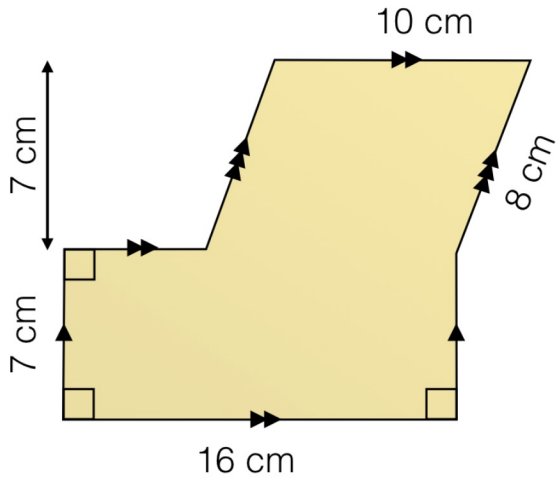
Worked Example	Your Turn
Calculate x if the area of the trapezium is 51cm^2: 	Calculate x if the area of the trapezium is 57cm^2: 

Worked Example	Your Turn
Calculate x if the area of the trapezium is 51cm^2: 	Calculate x if the area of the trapezium is 57cm^2: 

4.9 Area of Compound Shapes without Circles

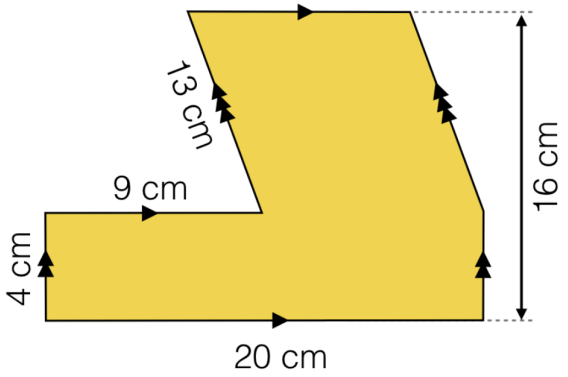
Worked Example

Calculate the area of the compound shape:



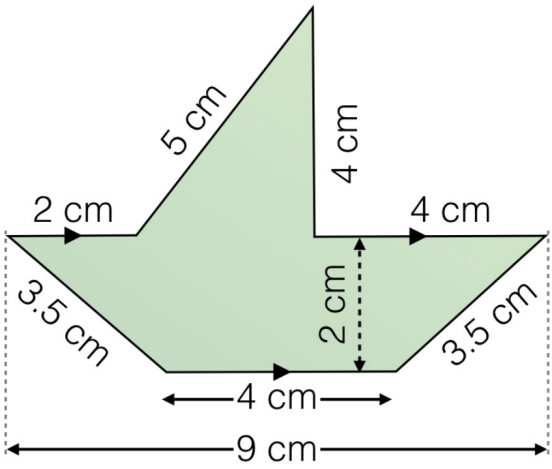
Your Turn

Calculate the area of the compound shape:



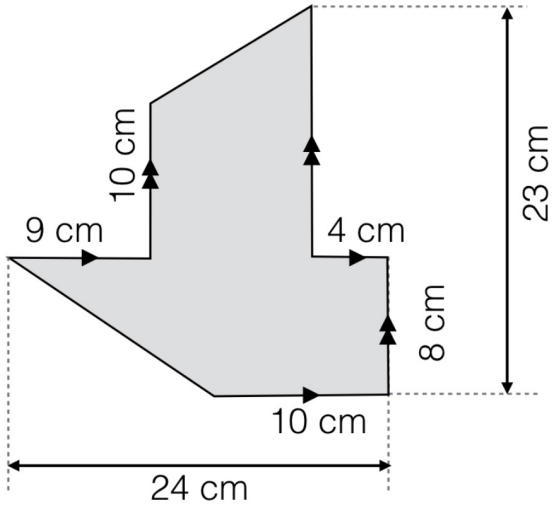
Worked Example

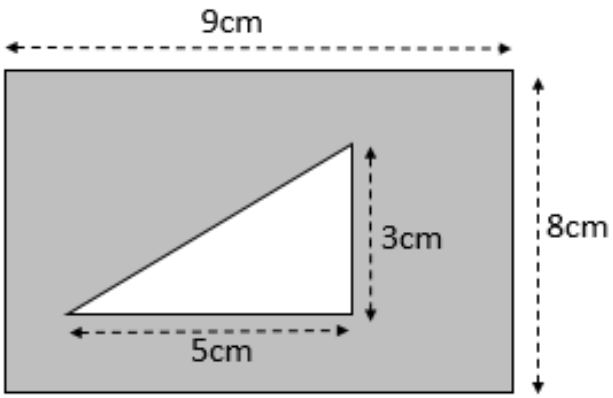
Calculate the area of the compound shape:



Your Turn

Calculate the area of the compound shape:



Worked Example	Your Turn
Calculate the area of the shaded shape:  	Calculate the area of the shaded shape: