



**KING EDWARD VI  
HANDSWORTH GRAMMAR  
SCHOOL FOR BOYS**



**KING EDWARD VI  
ACADEMY TRUST  
BIRMINGHAM**

**Year 7**

**2023**

**Mathematics**

**2024**

**Unit 3 Tasks – Part 1**

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**Unit 3 Tasks – Part 2**

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**Unit 3 Tasks – Part 3**

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# 1 Fractions

# Fluency Practice

Question 1: Find the missing numbers

(a)  $\frac{2}{3} = \frac{\quad}{6}$

(b)  $\frac{1}{5} = \frac{\quad}{20}$

(c)  $\frac{3}{4} = \frac{\quad}{12}$

(d)  $\frac{5}{7} = \frac{10}{\quad}$

(e)  $\frac{\quad}{5} = \frac{15}{25}$

(f)  $\frac{4}{\quad} = \frac{12}{21}$

(g)  $\frac{3}{10} = \frac{\quad}{50}$

(h)  $\frac{7}{8} = \frac{14}{\quad}$

(i)  $\frac{3}{4} = \frac{30}{\quad}$

(j)  $\frac{\quad}{8} = \frac{55}{88}$

(k)  $\frac{2}{9} = \frac{10}{\quad}$

(l)  $\frac{2}{3} = \frac{\quad}{18}$

(m)  $\frac{1}{20} = \frac{5}{\quad}$

(n)  $\frac{5}{6} = \frac{\quad}{18}$

(o)  $\frac{3}{8} = \frac{9}{\quad}$

(p)  $\frac{7}{12} = \frac{\quad}{36}$

Question 2: Find the missing numbers

(a)  $\frac{6}{7} = \frac{42}{\quad}$

(b)  $\frac{9}{20} = \frac{63}{\quad}$

(c)  $\frac{5}{12} = \frac{35}{\quad}$

(d)  $\frac{7}{8} = \frac{\quad}{64}$

(e)  $\frac{4}{\quad} = \frac{32}{72}$

(f)  $\frac{3}{4} = \frac{\quad}{52}$

(g)  $\frac{7}{25} = \frac{140}{\quad}$

(h)  $\frac{\quad}{15} = \frac{42}{105}$

(i)  $\frac{11}{16} = \frac{88}{\quad}$

(j)  $\frac{2}{9} = \frac{\quad}{108}$

(k)  $\frac{13}{25} = \frac{\quad}{375}$

(l)  $\frac{9}{\quad} = \frac{81}{144}$

# Intelligent Practice

Multiply these fractions so they have a denominator of 30

1)  $\frac{1}{15}$

2)  $\frac{1}{10}$

3)  $\frac{1}{6}$

4)  $\frac{1}{5}$

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

6)  $\frac{1}{2}$

7)  $\frac{3}{6}$

8)  $\frac{3}{5}$

9)  $\frac{3}{10}$

10)  $\frac{3}{15}$

11)  $\frac{8}{15}$

12)  $\frac{80}{150}$

Multiply these fractions so they have a denominator of 24

1)  $\frac{2}{12}$

2)  $\frac{2}{8}$

3)  $\frac{2}{6}$

4)  $\frac{2}{4}$

5)  $\frac{2}{3}$

6)  $\frac{3}{2}$

7)  $\frac{4}{2}$

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

9)  $\frac{6}{3}$

10) 2

11) 1

12) 0

# Fluency Practice

practice makes perfect: equivalent fractions using the digits 1 to 9

1)

$$\frac{1}{2} = \frac{7269}{\boxed{\phantom{0000}}}$$

2)

$$\frac{1}{2} = \frac{\boxed{\phantom{0000}}}{18546}$$

3)

$$\frac{1}{2} = \frac{\boxed{\phantom{0000}}}{15864}$$

4)

$$\frac{1}{4} = \frac{\boxed{\phantom{0000}}}{31824}$$

5)

$$\frac{1}{4} = \frac{\boxed{\phantom{0000}}}{23184}$$

6)

$$\frac{1}{4} = \frac{3942}{\boxed{\phantom{0000}}}$$

7)

$$\frac{1}{5} = \frac{\boxed{\phantom{0000}}}{16485}$$

8)

$$\frac{1}{5} = \frac{\boxed{\phantom{0000}}}{48615}$$

9)

$$\frac{1}{5} = \frac{2697}{\boxed{\phantom{0000}}}$$

10)

$$\frac{1}{6} = \frac{\boxed{\phantom{0000}}}{17658}$$

11)

$$\frac{1}{6} = \frac{\boxed{\phantom{0000}}}{34182}$$

12)

$$\frac{1}{6} = \frac{4653}{\boxed{\phantom{0000}}}$$

13)

$$\frac{1}{7} = \frac{\boxed{\phantom{0000}}}{41832}$$

14)

$$\frac{1}{7} = \frac{\boxed{\phantom{0000}}}{53298}$$

15)

$$\frac{1}{7} = \frac{2394}{\boxed{\phantom{0000}}}$$

16)

$$\frac{1}{8} = \frac{\boxed{\phantom{0000}}}{65432}$$

17)

$$\frac{1}{8} = \frac{\boxed{\phantom{0000}}}{51832}$$

18)

$$\frac{1}{8} = \frac{7123}{\boxed{\phantom{0000}}}$$

19)

$$\frac{1}{9} = \frac{\boxed{\phantom{0000}}}{57429}$$

20)

$$\frac{1}{9} = \frac{\boxed{\phantom{0000}}}{75249}$$

21)

$$\frac{1}{9} = \frac{6471}{\boxed{\phantom{0000}}}$$

22)

$$\frac{1}{12} = \frac{\boxed{\phantom{0000}}}{89532}$$

23)

$$\frac{1}{12} = \frac{\boxed{\phantom{0000}}}{45792}$$

24)

$$\frac{1}{12} = \frac{6129}{\boxed{\phantom{0000}}}$$

## Fluency Practice

$$\frac{3}{4} = \frac{\square}{8} = \frac{\square}{12} = \frac{\square}{16} = \frac{\square}{28} = \frac{\square}{320}$$

$$\frac{\square}{5} = \frac{\square}{10} = \frac{\square}{15} = \frac{\square}{30} = \frac{\square}{60} = \frac{480}{600}$$

$$\frac{\square}{3} = \frac{\square}{9} = \frac{8}{12} = \frac{\square}{18} = \frac{\square}{30} = \frac{\square}{150}$$

$$\frac{\square}{8} = \frac{\square}{16} = \frac{\square}{32} = \frac{25}{40} = \frac{\square}{64} = \frac{\square}{400}$$

# Fluency Practice

Match the cards into groups of three that are equivalent. Record your answers here:


$$\frac{16}{12}$$

$$1\frac{1}{3}$$

$$\frac{15}{20}$$

$$\frac{10}{80}$$

$$\frac{21}{49}$$

$$\frac{12}{15}$$

$$\frac{16}{40}$$

$$3\frac{1}{9}$$

$$1\frac{1}{6}$$

$$3\frac{1}{21}$$

$$3\frac{3}{4}$$

$$\frac{10}{16}$$

$$4\frac{1}{3}$$

$$\frac{32}{40}$$

$$1\frac{1}{8}$$

$$\frac{15}{35}$$

$$1\frac{1}{7}$$

$$5\frac{1}{35}$$

$$\frac{30}{48}$$

$$6\frac{1}{8}$$

$$4\frac{1}{32}$$

$$4\frac{1}{24}$$

$$8\frac{1}{48}$$

$$4\frac{1}{5}$$

$$3\frac{1}{7}$$

$$\frac{32}{24}$$

$$2\frac{1}{5}$$

$$\frac{10}{30}$$

$$5\frac{1}{8}$$

$$6\frac{1}{15}$$

# Fluency Practice

Find your way through the maze by shading all the blocks that are equivalent to the starting block. You cannot move diagonally.

Start $\frac{2}{3}$	$\frac{8}{12}$	$\frac{44}{66}$	$\frac{12}{30}$	$\frac{1}{5}$	$\frac{9}{12}$	$\frac{22}{34}$	$\frac{1}{10}$
$\frac{9}{12}$	$\frac{22}{32}$	$\frac{10}{15}$	$\frac{4}{9}$	$\frac{16}{28}$	$\frac{4}{18}$	$\frac{2}{12}$	$\frac{2}{5}$
$\frac{2}{5}$	$\frac{12}{24}$	$\frac{20}{30}$	$\frac{6}{8}$	$\frac{12}{18}$	$\frac{18}{27}$	$\frac{6}{9}$	$\frac{200}{300}$
$\frac{6}{15}$	$\frac{14}{22}$	$\frac{40}{60}$	$\frac{8}{14}$	$\frac{30}{45}$	$\frac{12}{32}$	$\frac{16}{48}$	$\frac{14}{21}$
$\frac{1}{8}$	$\frac{10}{25}$	$\frac{22}{33}$	$\frac{16}{24}$	$\frac{24}{36}$	$\frac{6}{12}$	$\frac{10}{14}$	$\frac{26}{39}$
$\frac{4}{7}$	$\frac{3}{8}$	$\frac{36}{48}$	$\frac{6}{20}$	$\frac{6}{18}$	$\frac{10}{25}$	$\frac{1}{4}$	Finish $\frac{4}{6}$

# Fluency Practice

start	$\frac{3}{5}$	$\frac{20}{100}$	$\frac{3}{8}$	$\frac{5}{30}$	$\frac{3}{3}$
$\frac{8}{16}$	$\frac{3}{4}$	$\frac{10}{30}$	$\frac{2}{7}$	$\frac{8}{28}$	$\frac{1}{6}$
$\frac{9}{9}$	$\frac{1}{2}$	$\frac{16}{36}$	$\frac{2}{3}$	$\frac{12}{20}$	$\frac{1}{4}$
$\frac{25}{100}$	$\frac{2}{6}$	$\frac{12}{18}$	$\frac{1}{5}$	$\frac{15}{40}$	$\frac{1}{11}$
$\frac{4}{36}$	$\frac{4}{9}$	$\frac{21}{28}$	$\frac{1}{9}$	$\frac{2}{22}$	finish



# Fluency Practice

Place the numbers at the bottom of the page in the missing squares to make each pair of fractions equivalent.  
You may only use each number once. There are no improper fractions.

A.  $\frac{1}{3} = \frac{8}{\square}$       D.  $\frac{3}{4} = \frac{\square}{36}$       G.  $\frac{1}{6} = \frac{\square}{\square}$       K.  $\frac{\square}{8} = \frac{\square}{24}$

B.  $\frac{1}{5} = \frac{6}{\square}$       E.  $\frac{3}{5} = \frac{\square}{40}$       H.  $\frac{\square}{5} = \frac{\square}{35}$       L.  $\frac{\square}{3} = \frac{\square}{12}$

C.  $\frac{2}{\square} = \frac{10}{35}$       F.  $\frac{1}{\square} = \frac{\square}{32}$       J.  $\frac{\square}{3} = \frac{10}{\square}$       M.  $\frac{2}{\square} = \frac{\square}{\square}$

- 
- 2    4    4    4    7    8    9    15    18    24    30  
 1    2    2    5    7    8    8    12    15    24    27

# Fluency Practice

1) Numerator Denominator  
1 → 3  
↓ ↓  
3 →

2) Numerator Denominator  
2 → 5  
↓ ↓  
4 →

3) Numerator Denominator  
2 → 7  
↓ ↓  
6 →

4) Numerator Denominator  
1 → 3  
↓ ↓  
 → 12

5) Numerator Denominator  
2 → 3  
↓ ↓  
 → 15

6) Numerator Denominator  
4 → 8  
↓ ↓  
 → 4

7) Numerator Denominator  
 → 3  
↓ ↓  
7 → 21

8) Numerator Denominator  
 → 9  
↓ ↓  
9 → 81

9) Numerator Denominator  
 → 4  
↓ ↓  
32 → 16

10)  $\frac{28}{70} = \frac{[\quad]}{10}$

11)  $\frac{45}{99} = \frac{[\quad]}{11}$

12)  $\frac{18}{72} = \frac{3}{[\quad]}$

# Fluency Practice

There are 8 fractions in this grid that are the same as:  $\frac{1}{2}$   
Shade them.

$\frac{4}{8}$	$\frac{8}{24}$	$\frac{12}{56}$	$\frac{24}{48}$	$\frac{16}{72}$	$\frac{12}{48}$	$\frac{16}{64}$
$\frac{16}{48}$	$\frac{36}{72}$	$\frac{4}{48}$	$\frac{16}{64}$	$\frac{40}{80}$	$\frac{12}{56}$	$\frac{4}{48}$
$\frac{8}{40}$	$\frac{16}{80}$	$\frac{44}{88}$	$\frac{12}{64}$	$\frac{12}{40}$	$\frac{4}{24}$	$\frac{12}{56}$
$\frac{4}{24}$	$\frac{16}{32}$	$\frac{12}{12}$	$\frac{12}{24}$	$\frac{32}{64}$	$\frac{12}{64}$	$\frac{4}{24}$

There are 8 fractions in this grid that are the same as:  $\frac{2}{5}$   
Shade them.

$\frac{2}{5}$	$\frac{2}{15}$	$\frac{6}{15}$	$\frac{20}{50}$	$\frac{4}{30}$	$\frac{10}{25}$	$\frac{8}{35}$
$\frac{2}{15}$	$\frac{6}{45}$	$\frac{6}{25}$	$\frac{14}{35}$	$\frac{6}{30}$	$\frac{4}{20}$	$\frac{4}{15}$
$\frac{18}{45}$	$\frac{6}{35}$	$\frac{4}{30}$	$\frac{6}{45}$	$\frac{6}{35}$	$\frac{16}{40}$	$\frac{12}{12}$
$\frac{2}{15}$	$\frac{8}{35}$	$\frac{2}{20}$	$\frac{2}{25}$	$\frac{22}{55}$	$\frac{4}{30}$	$\frac{2}{30}$

# Fluency Practice

In each box, find pairs of numbers that are **equal** to each other.  
Circle the number that is left over.

A

$\frac{1}{4}$	$\frac{2}{10}$	$\frac{1}{2}$
$\frac{11}{12}$	$\frac{3}{6}$	$\frac{3}{12}$
$\frac{1}{6}$	$\frac{5}{30}$	$\frac{1}{5}$

B

$\frac{8}{32}$	$\frac{1}{8}$	$\frac{3}{9}$
$\frac{1}{3}$	$\frac{1}{9}$	$\frac{2}{18}$
$\frac{2}{9}$	$\frac{2}{16}$	$\frac{1}{4}$

C

$\frac{1}{10}$	$\frac{3}{4}$	$\frac{12}{24}$
$\frac{4}{6}$	$\frac{1}{2}$	$\frac{11}{110}$
$\frac{9}{12}$	$\frac{2}{3}$	$\frac{3}{5}$

D

$\frac{4}{7}$	$\frac{12}{14}$	$\frac{5}{7}$
$\frac{50}{70}$	$\frac{15}{35}$	$\frac{12}{21}$
$\frac{3}{7}$	$\frac{8}{28}$	$\frac{2}{7}$

E

$\frac{2}{5}$	$\frac{14}{21}$	$\frac{30}{36}$
$\frac{15}{27}$	$\frac{5}{6}$	$\frac{5}{9}$
$\frac{10}{24}$	$\frac{2}{3}$	$\frac{12}{30}$

F

$\frac{56}{72}$	$\frac{49}{70}$	$\frac{21}{28}$
$\frac{9}{15}$	$\frac{7}{9}$	$\frac{7}{10}$
$\frac{2}{5}$	$\frac{6}{10}$	$\frac{15}{20}$

G

$\frac{4}{28}$	$\frac{12}{15}$	$\frac{9}{24}$
$\frac{8}{16}$	$\frac{9}{36}$	$\frac{7}{49}$
$\frac{7}{28}$	$\frac{21}{56}$	$\frac{32}{40}$

H

$\frac{25}{10}$	$\frac{28}{4}$	6
$\frac{35}{5}$	$\frac{18}{6}$	$\frac{5}{2}$
$\frac{48}{8}$	$\frac{24}{8}$	$\frac{4}{1}$

I

$1\frac{1}{2}$	$\frac{7}{2}$	$\frac{7}{3}$
$3\frac{1}{2}$	$2\frac{1}{3}$	$4\frac{1}{2}$
$\frac{4}{2}$	$\frac{18}{4}$	$\frac{3}{2}$

J

$1\frac{3}{4}$	$\frac{15}{4}$	$2\frac{1}{4}$
$\frac{9}{4}$	$\frac{11}{4}$	$\frac{7}{4}$
$2\frac{3}{4}$	$\frac{17}{4}$	$4\frac{1}{4}$

K

$1\frac{4}{6}$	$\frac{6}{5}$	$3\frac{8}{4}$
$\frac{15}{6}$	5	$\frac{5}{3}$
$3\left(\frac{2}{5}\right)$	$2\frac{2}{4}$	$\frac{17}{5}$

L

$\frac{-5}{2}$	$\frac{-7}{-14}$	$\frac{5}{-4}$
$-1\frac{1}{4}$	$-\frac{1}{2}$	$\frac{10}{-4}$
$-\frac{2}{3}$	$\frac{1}{2}$	$\frac{-6}{9}$

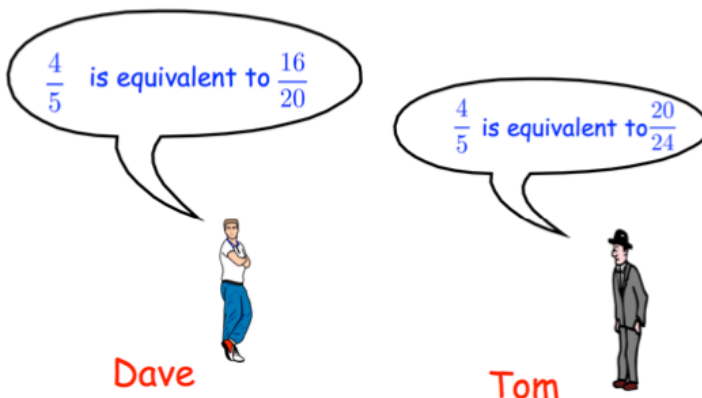
# Extension

Question 1: Write down 3 different fractions that are equivalent to  $\frac{1}{2}$

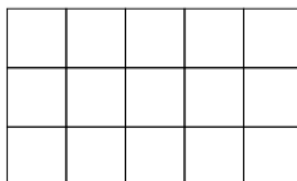
Question 2: Write down 3 different fractions that are equivalent to  $\frac{3}{5}$

Question 3: Write down 3 different fractions that are equivalent to  $\frac{7}{12}$

Question 4: Dave and Tom are discussing fractions.  
Is either man correct?



Question 5: Use the grid to explain why  $\frac{3}{4}$  cannot be written as a fraction with a denominator of 15.



Question 6: Macey has completed her maths homework.  
Can you explain what she has done wrong?

(a)  $\frac{3}{4} = \frac{\boxed{4}}{16}$

(c)  $\frac{7}{8} = \frac{35}{\boxed{5}}$

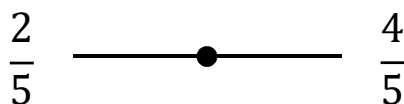
(b)  $\frac{\boxed{3}}{5} = \frac{6}{15}$

(d)  $\frac{2}{\boxed{8}} = \frac{16}{40}$

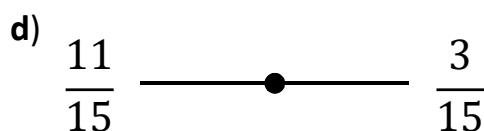
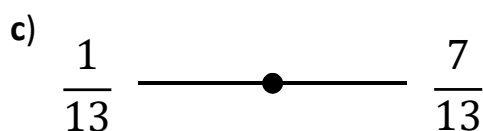
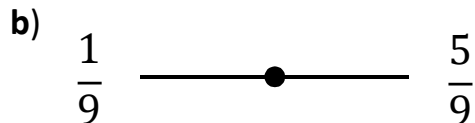
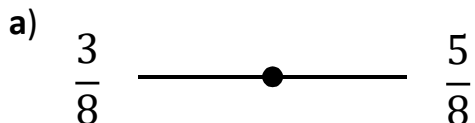
# Purposeful Practice

## Halfway Fractions

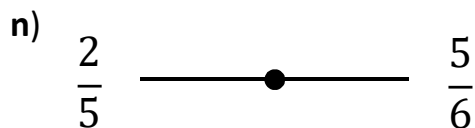
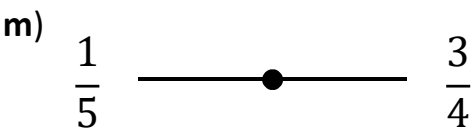
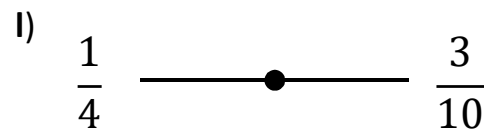
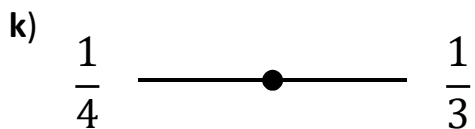
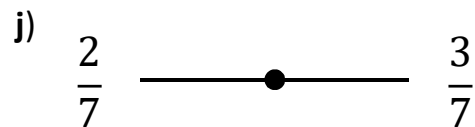
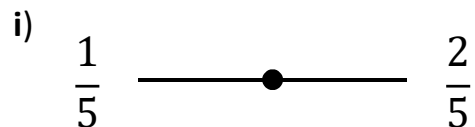
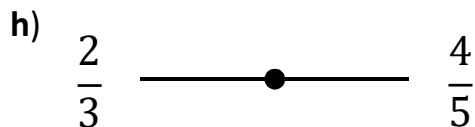
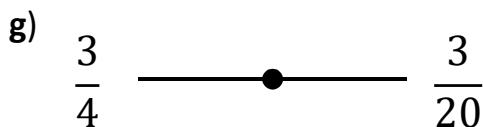
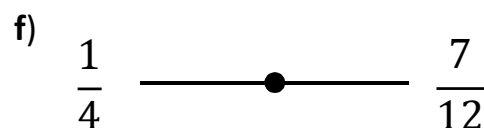
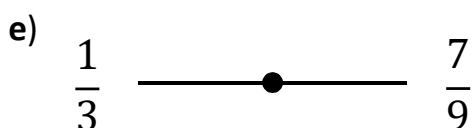
What fraction is exactly halfway between  $\frac{2}{5}$  &  $\frac{4}{5}$  ?



Find the fraction that is halfway between each pair of fractions.



How can we use **equivalent fractions** to find the halfway fractions for these pairs?



# Fluency Practice

Question 1: Simplify fully

(a)  $\frac{2}{4}$     (b)  $\frac{6}{9}$     (c)  $\frac{6}{8}$     (d)  $\frac{5}{15}$     (e)  $\frac{4}{6}$     (f)  $\frac{9}{12}$

(g)  $\frac{10}{15}$     (h)  $\frac{9}{15}$     (i)  $\frac{8}{12}$     (j)  $\frac{10}{14}$     (k)  $\frac{15}{35}$     (l)  $\frac{6}{21}$

(m)  $\frac{18}{22}$     (n)  $\frac{16}{20}$     (o)  $\frac{9}{24}$     (p)  $\frac{20}{30}$     (q)  $\frac{8}{28}$     (r)  $\frac{300}{500}$

Question 2: Cancel down each fraction to its simplest form

(a)  $\frac{14}{35}$     (b)  $\frac{8}{64}$     (c)  $\frac{18}{24}$     (d)  $\frac{75}{100}$     (e)  $\frac{24}{80}$     (f)  $\frac{6}{42}$

(g)  $\frac{36}{66}$     (h)  $\frac{18}{45}$     (i)  $\frac{70}{120}$     (j)  $\frac{49}{56}$     (k)  $\frac{22}{110}$     (l)  $\frac{18}{72}$

(m)  $\frac{60}{140}$     (n)  $\frac{45}{135}$     (o)  $\frac{40}{360}$     (p)  $\frac{64}{100}$     (q)  $\frac{85}{35}$     (r)  $\frac{48}{36}$

Question 3: Simplify fully

(a)  $\frac{145}{225}$     (b)  $\frac{190}{570}$     (c)  $\frac{200}{288}$     (d)  $\frac{230}{495}$     (e)  $\frac{54}{333}$     (f)  $\frac{96}{123}$

# Intelligent Practice

Simplify (if possible)

1)  $\frac{2}{12}$

2)  $\frac{3}{12}$

3)  $\frac{4}{12}$

4)  $\frac{5}{12}$

5)  $\frac{10}{12}$

6)  $\frac{20}{24}$

7)  $\frac{15}{18}$

8)  $\frac{35}{42}$

9)  $\frac{35}{49}$

10)  $\frac{35}{56}$

11)  $\frac{56}{35}$

12)  $\frac{35}{35}$

13)  $\frac{5}{5}$

14)  $\frac{0}{5}$

15)  $\frac{15}{5}$

16)  $\frac{14}{4}$

17)  $\frac{13}{3}$

18)  $\frac{12}{2}$

19)  $\frac{12}{1}$

20)  $\frac{12}{18}$

21)  $3\frac{12}{18}$

22)  $6\frac{12}{18}$

23)  $\frac{612}{18}$

24)  $\frac{603}{18}$



# Extension

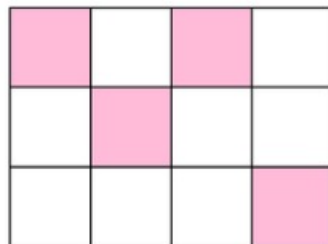
Question 1: Which fractions below are equivalent to  $\frac{2}{3}$ ?

$$\frac{4}{6} \quad \frac{6}{8} \quad \frac{8}{12} \quad \frac{9}{12} \quad \frac{10}{15}$$

Question 2: James says that  $\frac{1}{3}$  of the grid is shaded

Cara says  $\frac{4}{12}$  of the grid is shaded.

Explain how they are both correct.



Question 3: Given that  $5 \times 13 = 65$  and  $7 \times 13 = 91$  simplify fully  $\frac{65}{91}$

Question 4: Freddy has 40 cupcakes.  
20 of the cupcakes are chocolate.  
10 of the cupcakes are lemon.  
8 of the cupcakes are strawberry.  
The rest of the cupcakes of vanilla.



- What fraction of the cupcakes are chocolate?  
Give the fraction in its simplest form.
- What fraction of the cupcakes are lemon?  
Give the fraction in its simplest form.
- What fraction of the cupcakes are strawberry?  
Give the fraction in its simplest form.
- What fraction of the cupcakes are vanilla?  
Give the fraction in its simplest form.

Question 5: There are 200 students in a primary school.  
80 students wear glasses.  
What fraction of the students wear glasses?  
Give the fraction in its simplest form.

Question 6: Sarah has £240 and she gives her mum £80.  
What fraction of the money does Sarah have left?  
Give the fraction in its simplest form.

# More-Same-Less – Simplifying Fractions

Instructions: Simplify the fraction in the middle box. Then fill in the remaining boxes using fractions which simplify to unit fractions, making the minimum change possible from the middle box each time.

		Denominator of simplified unit fraction		
		Less	Same	More
Numerator of unsimplified fraction	More			
	Same		$\frac{5}{15}$	
	Less			

## Problem Solving

$$\frac{\begin{array}{|c|} \hline a \\ \hline \end{array} \begin{array}{|c|} \hline b \\ \hline \end{array}}{\begin{array}{|c|} \hline b \\ \hline \end{array} \begin{array}{|c|} \hline a \\ \hline \end{array}}$$

when will this simplify?

# Fluency Practice

Simplify each fraction.

a.  $\frac{0.5}{0.8}$

b.  $\frac{0.3}{0.8}$

c.  $\frac{0.2}{0.8}$

d.  $\frac{0.5}{1}$

e.  $\frac{0.5}{2}$

f.  $\frac{0.5}{3}$

g.  $\frac{1.4}{2.8}$

h.  $\frac{0.25}{0.3}$

i.  $\frac{0.4}{0.125}$

Circle all the numbers which are equivalent to  $\frac{2}{3}$ .

$\frac{4}{5}$

$\frac{4}{6}$

$\frac{0.2}{0.3}$

$\frac{0.8}{1.2}$

$\frac{0.9}{1.2}$

$\frac{1.5}{2}$

$\frac{1}{1.5}$

## Fluency Practice

Question 1: Give each answer as a simplified fraction

- (a) Write 5 days as a fraction of 20 days
- (b) Write £6 as a fraction of £8
- (c) Write 10p as a fraction of 30p
- (d) Write 6kg as a fraction of 12kg
- (e) Write 9cm as a fraction of 15cm
- (f) Write 25 days as a fraction of 35 days
- (g) Write 8p as a fraction of 40p
- (h) Write 52p as a fraction of 90p
- (i) Write 30ml as a fraction of 110ml
- (j) Write 360kg as a fraction of 480kg

Question 2: Give each answer as a simplified fraction

- (a) Write 2 days as a fraction of 1 week
- (b) Write 40p as a fraction of £3
- (c) Write 5 minutes as a fraction of 2 hours
- (d) Write 2 months as a fraction of 1 year
- (e) Write 500g as a fraction of 40kg
- (f) Write 750ml as a fraction of 3 litres
- (g) Write 8g as a fraction of 4kg
- (h) Write 920mm as a fraction of 12m
- (i) Write £1.85 as a fraction of £1.20
- (j) Write 50 seconds as a fraction of 1 hour

# Extension

Question 1: There are 30 students in a class.  
20 students have brown hair.  
What fraction of the class have brown hair?  
Give your answer in its simplest form.

Question 2: A bag contains red and white sweets.  
There are 12 red sweets and 8 white sweets.  
What fraction of the sweets are white?  
Give your answer in its simplest form.

Question 3: Over one day, Rebecca spends 6 hours sleeping.  
What fraction of the day is Rebecca awake?  
Give your answer in its simplest form.

Question 4: John has 12 pieces of card, each with a letter written on it.

C O R B E T T M A T H S

- (a) What fraction of the letters are the letter T?
- (b) What fraction of the letters are the letter A?
- (c) What fraction of the letters are vowels?
- (d) What fraction of the letters are **not** the letter T?

Question 5: Jemima receives £5 pocket money.  
She spends £1.75 on a magazine and 80p on a drink.

- (a) What fraction of the pocket money has she spent?
- (b) What fraction of the pocket money does Jemima have left?

Question 6: In a town in Cornwall, it rained for 18 days during April.  
What fraction of the month did it rain?

Question 7: Barry is saving money towards a new motorbike that costs £4,000.  
Each month, he saves £5 more than the previous month.  
In January he saves £60.  
Over the first year of saving money, what fraction of the cost has he saved?

Question 8: In Victoria's class, there are 30 students.  
Explain why Victoria must be wrong.

Exactly  $\frac{2}{7}$  of the students in the class wear glasses.

Question 9: Nigel has completed his homework.  
Can you spot any mistakes?



In a bag there are 80 beads.  
There are 35 yellow beads.  
There are 17 red beads.  
The rest of the beads are white.

$$35 + 17 = 52$$
$$80 - 52 = 38$$

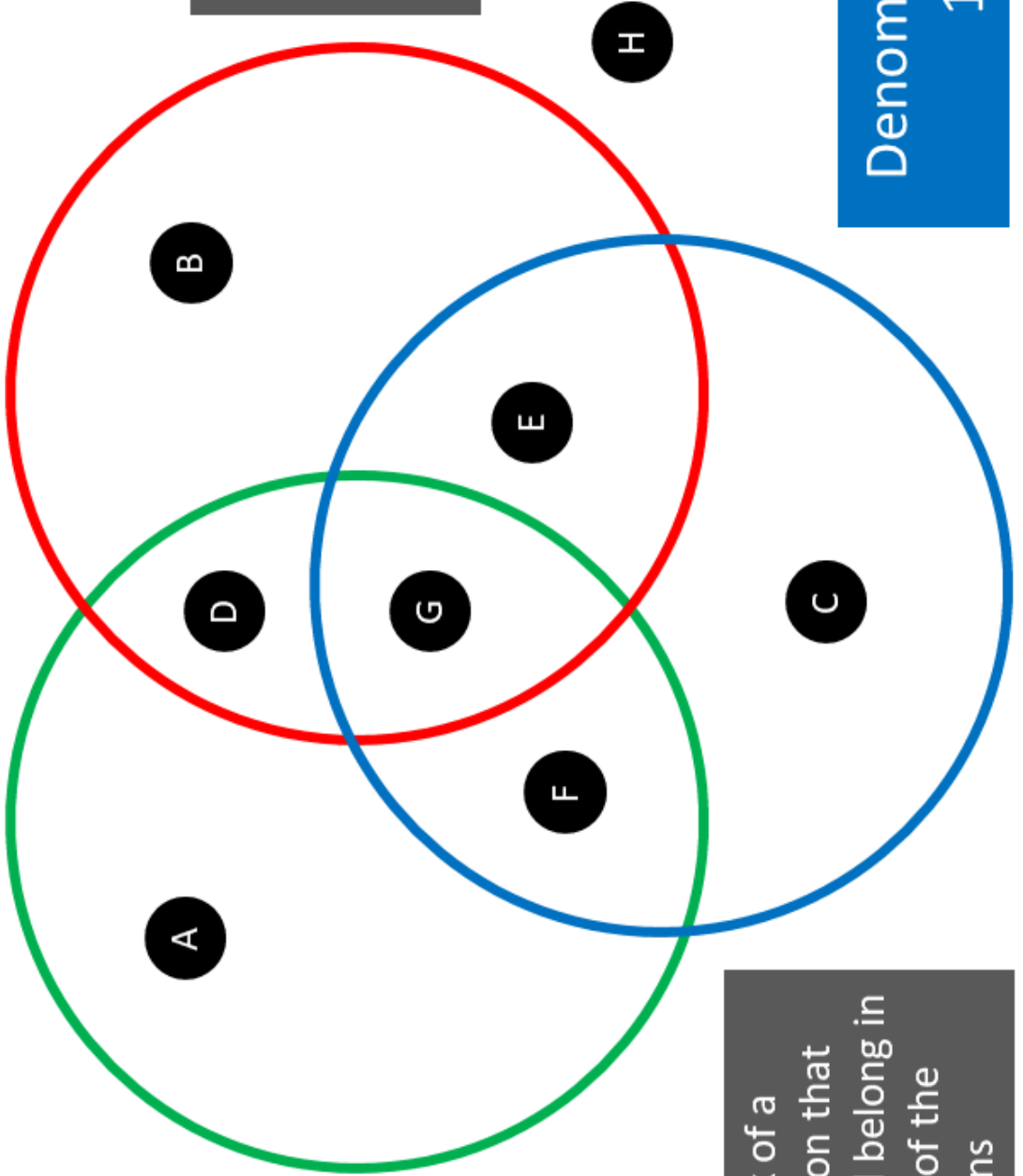
Work out what fraction of the beads are white.  
Give your answer in its simplest form.

$$\frac{38}{80} = \frac{19}{40}$$

# Maths Venns

Bigger than  $\frac{1}{2}$

Simplifies



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

Denominator is 12

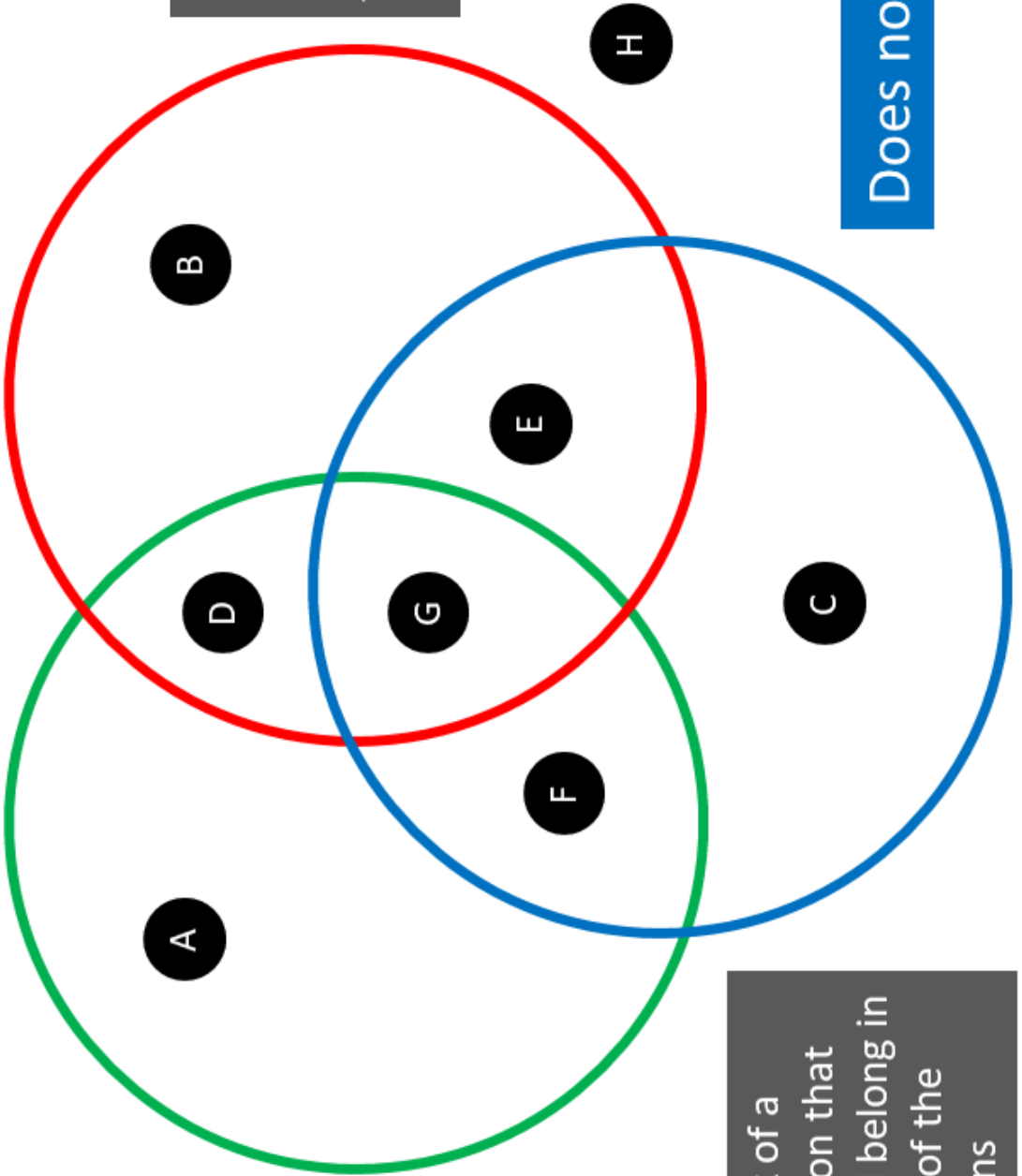
Think of a fraction that could belong in each of the regions

# Maths Venns

Smaller than  $\frac{1}{3}$

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

Does not simplify



Bigger than  $\frac{1}{4}$

Think of a fraction that could belong in each of the regions



## Fluency Practice

Question 1: Change these improper fractions into mixed numbers

(a)  $\frac{7}{3}$

(b)  $\frac{7}{5}$

(c)  $\frac{5}{2}$

(d)  $\frac{8}{7}$

(e)  $\frac{5}{3}$

(f)  $\frac{10}{3}$

(g)  $\frac{23}{2}$

(h)  $\frac{11}{4}$

(i)  $\frac{11}{8}$

(j)  $\frac{9}{4}$

(k)  $\frac{13}{10}$

(l)  $\frac{13}{6}$

(m)  $\frac{16}{7}$

(n)  $\frac{51}{10}$

(o)  $\frac{34}{11}$

(p)  $\frac{29}{12}$

(q)  $\frac{60}{11}$

(r)  $\frac{47}{15}$

(s)  $\frac{101}{9}$

(t)  $\frac{99}{20}$

(u)  $\frac{12}{9}$

(v)  $\frac{35}{10}$

(w)  $\frac{18}{4}$

(x)  $\frac{50}{6}$

(y)  $\frac{40}{15}$

# Intelligent Practice

Convert the following improper fractions into mixed numbers:

1)  $\frac{7}{4}$

2)  $\frac{9}{4}$

3)  $\frac{9}{8}$

4)  $\frac{18}{8}$

5)  $\frac{36}{8}$

6)  $\frac{36}{4}$

7)  $\frac{36}{2}$

8)  $\frac{37}{2}$

9)  $\frac{37}{3}$

## Fluency Practice

Question 2: Change these mixed numbers into improper fractions

(a)  $2\frac{1}{5}$

(b)  $3\frac{1}{2}$

(c)  $1\frac{3}{4}$

(d)  $3\frac{2}{3}$

(e)  $1\frac{2}{5}$

(f)  $2\frac{4}{7}$

(g)  $1\frac{1}{3}$

(h)  $2\frac{3}{10}$

(i)  $4\frac{3}{4}$

(j)  $1\frac{7}{12}$

(k)  $3\frac{9}{10}$

(l)  $2\frac{3}{50}$

(m)  $3\frac{5}{8}$

(n)  $8\frac{3}{8}$

(o)  $1\frac{14}{32}$

(p)  $2\frac{19}{24}$

(q)  $12\frac{1}{9}$

(r)  $5\frac{4}{15}$

(s)  $4\frac{11}{12}$

(t)  $13\frac{7}{16}$

# Intelligent Practice

Convert the following mixed numbers into improper fractions:

1)  $1\frac{1}{5}$

2)  $2\frac{1}{5}$

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

4)  $3\frac{2}{5}$

5)  $3\frac{3}{5}$

6)  $3\frac{3}{10}$

7)  $3\frac{3}{9}$

8)  $4\frac{3}{9}$

# Extension

Question 1: Match up the improper fractions and mixed numbers.

$$2\frac{1}{4}$$

$$2\frac{1}{3}$$

$$1\frac{3}{4}$$

$$3\frac{2}{3}$$

$$\frac{7}{4}$$

$$\frac{11}{3}$$

$$\frac{7}{3}$$

$$\frac{9}{4}$$

Question 2: Arrange these improper fractions in order, starting with the smallest.

$$\frac{23}{4}, \frac{37}{7}, \frac{11}{2}$$

Question 3: Write down a mixed number between  $3\frac{3}{11}$  and  $3\frac{2}{5}$

Question 4: Gregory feeds his cat  $\frac{2}{5}$  of a can of cat food each day.

Work out how many cans of cat food are eaten each fortnight.

Give your answer as a mixed number.



Question 5:

$$13$$

$$9$$

$$21$$

$$5$$

$$2$$

Using the cards, create an improper fraction that is:

- (a) between 1 and 2
- (c) between 4 and 5
- (e) greater than 10

- (b) between 2 and 3
- (d) between 5 and 10

# Intelligent Practice

$$\frac{3}{5} + \frac{3}{5} = \_ + \_$$

$$\frac{3}{5} + \frac{1}{5} = \_ + \_$$

$$\frac{3}{5} - \frac{1}{5} = \_ - \_$$

$$\frac{3}{5} - \frac{1}{10} = \_ - \_$$

$$\frac{3}{5} - \frac{3}{10} = \_ - \_$$

$$\frac{3}{5} - \frac{3}{25} = \_ - \_$$

$$\frac{3}{10} - \frac{3}{25} = \_ - \_$$

$$\frac{3}{25} - \frac{3}{10} = \_ - \_$$

$$\frac{3}{25} - \frac{3}{20} = \_ - \_$$

$$\frac{3}{25} - \frac{3}{4} = \_ - \_$$

$$\frac{3}{5} - \frac{3}{4} = \_ - \_$$

$$\frac{3}{6} - \frac{3}{4} = \_ - \_$$

# Fluency Practice

**Question 1:** Work out the following additions and subtractions.  
Give your answers as simplified fractions.

- |                                   |                                  |                                   |                                     |
|-----------------------------------|----------------------------------|-----------------------------------|-------------------------------------|
| (a) $\frac{2}{5} + \frac{1}{2}$   | (b) $\frac{2}{7} + \frac{1}{2}$  | (c) $\frac{1}{3} + \frac{1}{2}$   | (d) $\frac{4}{5} - \frac{2}{3}$     |
| (e) $\frac{8}{9} - \frac{1}{3}$   | (f) $\frac{2}{3} + \frac{1}{6}$  | (g) $\frac{3}{10} + \frac{2}{5}$  | (h) $\frac{3}{8} + \frac{1}{4}$     |
| (i) $\frac{7}{15} - \frac{1}{5}$  | (j) $\frac{3}{4} - \frac{2}{5}$  | (k) $\frac{3}{10} + \frac{3}{8}$  | (l) $\frac{2}{5} + \frac{4}{7}$     |
| (m) $\frac{11}{15} - \frac{1}{6}$ | (n) $\frac{5}{11} + \frac{1}{4}$ | (o) $\frac{3}{14} + \frac{1}{3}$  | (p) $\frac{11}{13} - \frac{1}{2}$   |
| (q) $\frac{7}{20} + \frac{2}{5}$  | (r) $\frac{8}{9} - \frac{3}{5}$  | (s) $\frac{11}{18} + \frac{1}{6}$ | (t) $\frac{39}{100} - \frac{7}{20}$ |
| (u) $\frac{4}{15} + \frac{5}{12}$ | (v) $\frac{2}{3} - \frac{9}{16}$ | (w) $\frac{19}{30} + \frac{1}{8}$ | (x) $\frac{7}{12} + \frac{3}{14}$   |

**Question 2:** Work out the following additions.  
Give your answers as simplified fractions.  
If necessary, give any answers as mixed numbers.

- |                                   |                                   |                                   |                                 |
|-----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|
| (a) $\frac{3}{4} + \frac{1}{2}$   | (b) $\frac{5}{9} + \frac{2}{3}$   | (c) $\frac{7}{10} + \frac{1}{3}$  | (d) $\frac{4}{5} + \frac{3}{4}$ |
| (e) $\frac{19}{20} + \frac{4}{5}$ | (f) $\frac{5}{9} + \frac{13}{18}$ | (g) $\frac{5}{12} + \frac{9}{10}$ | (h) $\frac{4}{7} + \frac{7}{8}$ |

# Fluency Practice

Simplify your answers where possible.

$$(a) \frac{5}{11} + \frac{4}{11}$$

$$(b) \frac{7}{15} + \frac{3}{15}$$

$$(c) \frac{5}{7} - \frac{3}{7}$$

$$(d) \frac{9}{10} - \frac{3}{10}$$

$$(a) \frac{1}{3} + \frac{1}{4}$$

$$(b) \frac{1}{3} + \frac{2}{7}$$

$$(c) \frac{1}{2} + \frac{2}{9}$$

$$(d) \frac{3}{4} + \frac{1}{5}$$

$$(e) \frac{1}{3} + \frac{4}{9}$$

$$(f) \frac{1}{6} + \frac{3}{4}$$

$$(a) \frac{1}{3} - \frac{1}{5}$$

$$(b) \frac{1}{3} - \frac{2}{11}$$

$$(c) \frac{1}{2} - \frac{2}{7}$$

$$(d) \frac{3}{4} - \frac{1}{9}$$

$$(e) \frac{1}{3} - \frac{2}{9}$$

$$(f) \frac{5}{6} - \frac{3}{4}$$

$$(a) \frac{7}{12} + \frac{2}{5}$$

$$(b) \frac{8}{9} - \frac{1}{4}$$

$$(c) \frac{5}{6} - \frac{3}{7}$$

$$(d) \frac{9}{20} + \frac{2}{5}$$

$$(e) \frac{11}{15} - \frac{1}{6}$$

$$(f) \frac{2}{7} + \frac{3}{8}$$

$$(a) \frac{7}{20} + \frac{2}{5} + \frac{1}{10}$$

$$(b) \frac{3}{8} + \frac{1}{4} + \frac{1}{6}$$

$$(c) \frac{7}{9} + \frac{1}{18} - \frac{2}{3}$$

$$(d) \frac{43}{50} - \frac{1}{5} - \frac{7}{20}$$



# Intelligent Practice

Calculate:

1)  $\frac{1}{7} + \frac{2}{5}$

11)  $\frac{2}{5} - \frac{1}{7}$

2)  $\frac{2}{5} + \frac{1}{7}$

12)  $\frac{1}{7} - \frac{2}{5}$

3)  $\frac{2}{5} + \frac{2}{7}$

13)  $\frac{2}{5} - \frac{2}{7}$

4)  $\frac{2}{5} + \frac{2}{3}$

14)  $\frac{2}{3} - \frac{2}{5}$

5)  $\frac{1}{4} + \frac{2}{3}$

15)  $\frac{2}{3} - \frac{1}{4}$

6)  $\frac{3}{4} + \frac{2}{3}$

16)  $\frac{2}{3} - \frac{3}{4}$

7)  $\frac{3}{4} + \frac{2}{5}$

17)  $\frac{3}{4} - \frac{2}{3}$

8)  $\frac{3}{40} + \frac{2}{5}$

18)  $\frac{3}{4} - \frac{2}{20}$

9)  $\frac{3}{4} + \frac{3}{5}$

19)  $\frac{3}{4} - \frac{3}{5}$

10)  $\frac{3}{4} + \frac{6}{10}$

20)  $\frac{3}{4} - \frac{9}{15}$

# Fluency Practice

$\frac{1}{2}$	+	$\frac{1}{6}$	=	
$\frac{2}{5}$	+		=	$\frac{11}{15}$
$\frac{1}{7}$	+		=	$\frac{25}{28}$
$\frac{2}{3}$	+	$\frac{2}{7}$	=	
	+	$\frac{4}{5}$	=	$\frac{9}{10}$
	+		=	$\frac{27}{35}$

Can you put the missing numbers in the correct place to make these additions true?

$\frac{4}{6}$        $\frac{1}{3}$        $\frac{20}{21}$   
 $\frac{3}{4}$        $\frac{1}{5}$        $\frac{1}{10}$   
 $\frac{4}{7}$

## Problem Solving

Here is a set of six fractions:

$$\frac{1}{6} \quad \frac{1}{25} \quad \frac{3}{5} \quad \frac{3}{20} \quad \frac{4}{15} \quad \frac{5}{8}$$

Choose some of the fractions and add them together. You can use as many fractions as you like, but you can only use each fraction once.

**Can you get an answer that is close to 1?**

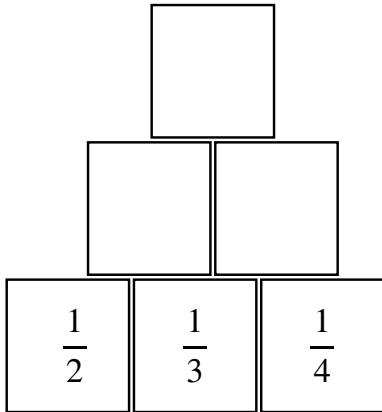
**What is the closest to 1 that you can get?**

# Problem Solving

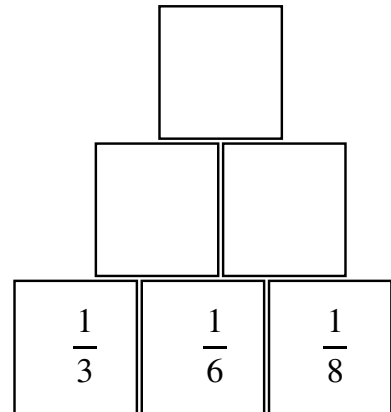
Each square is the sum of the two squares below.

You **cannot** use zero in any of the squares.

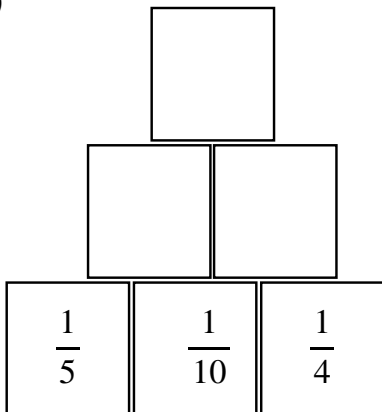
(1)



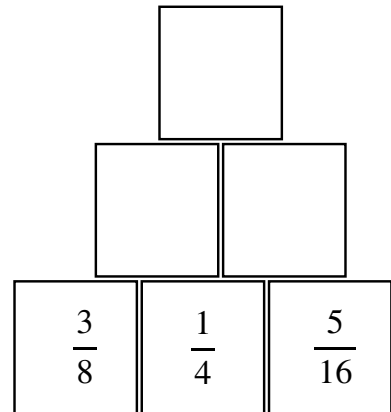
(2)



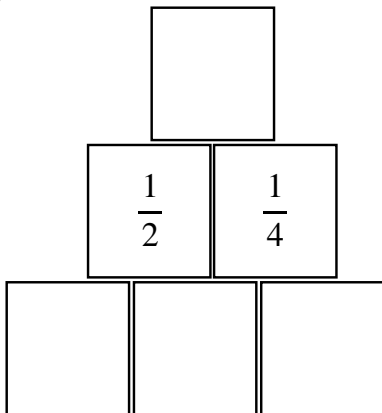
(3)



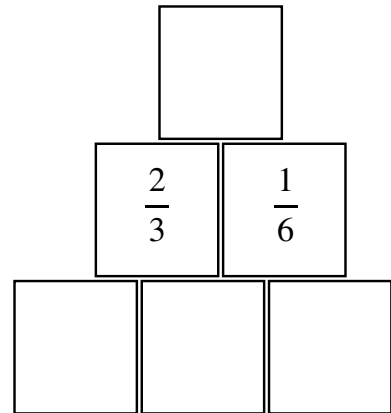
(4)



(5)

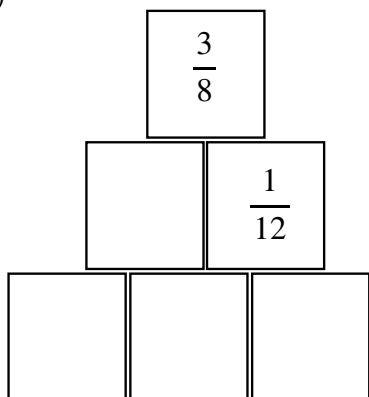


(6)

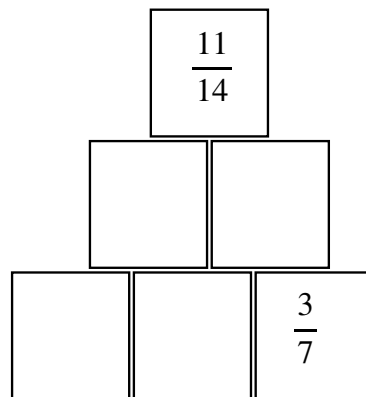


# Problem Solving

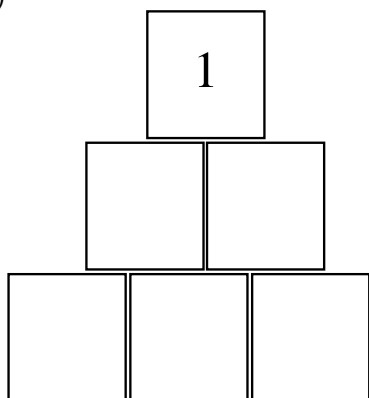
(7)



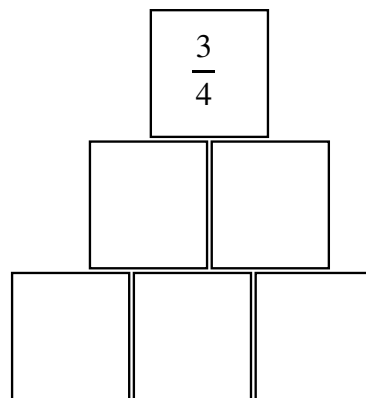
(8)



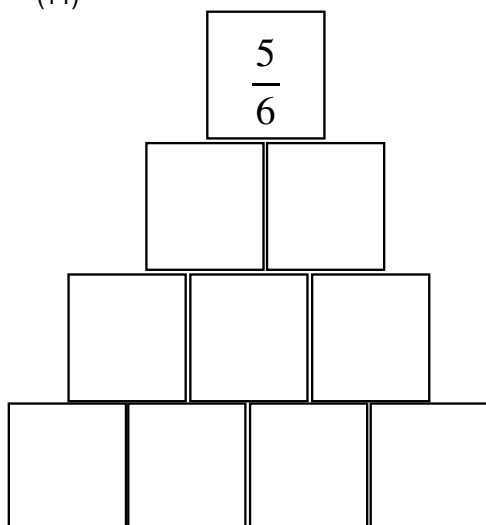
(9)



(10)



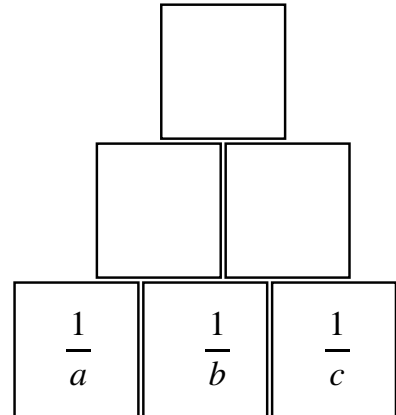
(11)



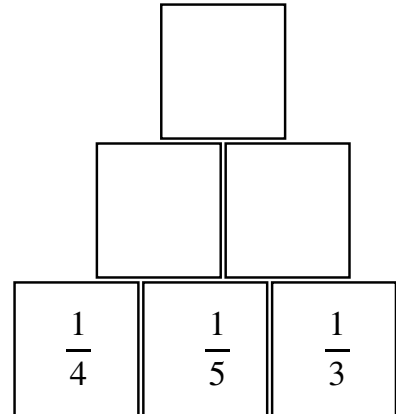
# Problem Solving

(12)

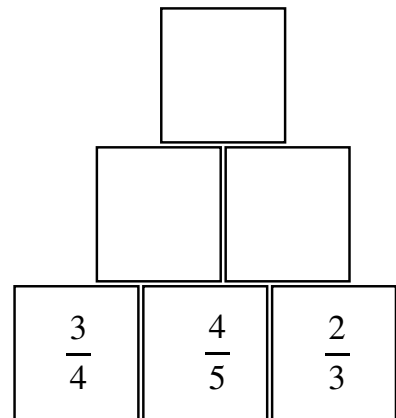
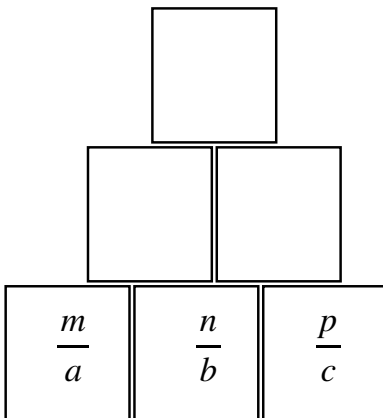
(a) Complete this pyramid



(b) Can you use the pyramid above to help you complete this pyramid, without doing any more fraction additions?



(c) Investigate the following pair of pyramids.



# More-Same-Less – Fraction Addition

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

		Value of the common denominator		
		Less	Same	More
Value of the result	More			
	Same		$\frac{3}{4} + \frac{7}{9}$	
	Less			

By Simon Curtis  
Bitterne Park School

# More-Same-Less – Fraction Subtraction

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

		Value of the common denominator		
		Less	Same	More
Value of the result	More			
	Same		$\frac{6}{7} - \frac{3}{5}$	
	Less			

By Simon Curtis  
Bitterne Park School



# Problem Solving

$$\frac{1}{\square} + \frac{1}{\square} + \frac{1}{\square} = 1$$

Place three of the digits 1 - 9 in the blanks, using no digit more than once, to make a true statement

# Problem Solving

where can you place the digits 2 , 3 , 4 and 5  
(all used, once only)

to make the result of the fraction sum

(i) as large as possible

(ii) as small as possible

$$\frac{\square}{\square} + \frac{\square}{\square}$$

for another set of four consecutive digits?

where can you place the digits 2 , 3 , 4 and 5  
(all used, once only)

to make the result of the fraction sum

(i) as large as possible

(ii) as small as possible

$$\frac{\square}{\square} - \frac{\square}{\square}$$

for another set of four consecutive digits?

## Fluency Practice

**Question 3:** Work out the following additions and subtractions.  
Give your answers as simplified fractions.  
If necessary, give any answers as mixed numbers.

(a)  $1\frac{1}{2} + \frac{2}{3}$

(b)  $\frac{7}{9} + 1\frac{1}{3}$

(c)  $1\frac{3}{5} - \frac{3}{4}$

(d)  $1\frac{5}{8} - 1\frac{1}{4}$

(e)  $2\frac{1}{2} + 1\frac{1}{3}$

(f)  $2\frac{2}{9} - 1\frac{1}{3}$

(g)  $2\frac{2}{9} + \frac{5}{6}$

(h)  $1\frac{5}{12} + 1\frac{5}{8}$

(i)  $3\frac{1}{10} + 2\frac{2}{3}$

(j)  $1\frac{8}{9} - \frac{4}{7}$

(k)  $3\frac{2}{3} - 1\frac{11}{20}$

(l)  $4\frac{8}{15} + 3\frac{1}{3}$

# Fluency Practice

Simplify your answers where possible.

(a)  $\frac{1}{3} + \frac{1}{4}$       (b)  $\frac{3}{4} - \frac{1}{9}$

(c)  $\frac{7}{12} + \frac{2}{5}$       (d)  $\frac{8}{9} - \frac{1}{4}$

(e)  $\frac{5}{6} - \frac{3}{7}$       (f)  $\frac{9}{20} + \frac{2}{5}$

(g)  $\frac{11}{15} - \frac{1}{6}$       (h)  $\frac{2}{7} + \frac{3}{8}$

Convert into improper fractions:

(a)  $2\frac{1}{2}$     (b)  $3\frac{4}{7}$     (c)  $5\frac{1}{6}$

(d)  $4\frac{2}{13}$     (e)  $7\frac{7}{10}$     (f)  $2\frac{5}{9}$

Convert into mixed numbers:

(a)  $\frac{8}{3}$     (b)  $\frac{25}{4}$     (c)  $\frac{31}{6}$

(d)  $\frac{18}{7}$     (e)  $\frac{92}{9}$     (f)  $\frac{59}{11}$

Calculate, giving your answers in their simplest form:

(a)  $1\frac{3}{5} + \frac{2}{5}$       (b)  $2\frac{6}{7} - 1\frac{1}{7}$

(c)  $5\frac{2}{3} - 2\frac{1}{6}$       (d)  $4\frac{1}{4} + 1\frac{5}{6}$

(e)  $2\frac{3}{7} + 3\frac{1}{4}$       (f)  $5\frac{2}{3} - 1\frac{4}{7}$

Milly's living room has an area of  $5\frac{2}{5} m^2$  and her dining kitchen has an area of  $4\frac{3}{7} m^2$ . What is the total area of these two rooms?

# Intelligent Practice

Calculate:

1)  $1\frac{1}{2} + 1\frac{1}{3}$

2)  $1\frac{1}{2} + 1\frac{1}{4}$

3)  $1\frac{1}{2} + 1\frac{1}{5}$

4)  $2\frac{1}{2} + 2\frac{1}{5}$

5)  $2\frac{1}{7} + 1\frac{1}{3}$

6)  $2\frac{1}{2} - 1\frac{1}{3}$

7)  $2\frac{1}{2} - 1\frac{1}{4}$

8)  $2\frac{1}{2} - 2\frac{1}{4}$

9)  $2\frac{1}{4} - 2\frac{1}{2}$

10)  $3\frac{1}{5} - 2\frac{1}{2}$

## Extension

Question 1: In a car park,  $\frac{2}{3}$  of the cars are red.

$\frac{1}{5}$  of the cars are blue.

What fraction of the cars are red or blue?

Question 2: This week Harry spent  $\frac{1}{2}$  of his pocket money on a ticket for a football match.

He also spent  $\frac{1}{8}$  of his pocket money on a scarf at the match.

(a) What fraction of his pocket money has Harry spent?

(b) What fraction of his pocket money does Harry have left?

Question 3: On an airplane, the passengers may have chicken, vegetable or tomato soup.

Half of the passengers choose chicken soup

A third of the passengers choose tomato soup.

(a) What fraction of the passengers choose vegetable soup?

There are 240 passengers on the airplane.

(b) How many passengers choose vegetable soup?

Question 4: Patrick has a bag of sugar that contains  $\frac{5}{6}$  kg

He uses  $\frac{3}{5}$  kg of sugar to make a cake.

How much sugar does Patrick have left?

Question 5: Work out  $\frac{1}{6} + \frac{1}{2} + \frac{2}{9}$

# Extension

Question 6: Jasmine has a bottle that contains  $\frac{7}{10}$  litre of orange juice.

She pours out some orange juice and now has  $\frac{1}{4}$  litre left.

How much orange juice did Jasmine pour out?

Question 7: In school, pupils study one language.

They choose either French, Spanish or Italian.

$\frac{3}{20}$  of the pupils study Italian and  $\frac{5}{8}$  of the pupils study French

What fraction of the pupils study Spanish?

Question 8: Shown below is a "magic square"

Each column, row and diagonal has the same total.

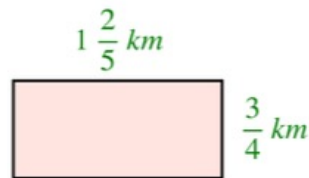
Work out the missing fractions.

$\frac{1}{10}$		$\frac{3}{10}$
$\frac{9}{20}$		
$\frac{1}{5}$	$\frac{3}{20}$	

Question 9: Lenny says  $\frac{7}{11} + \frac{2}{3} = \frac{9}{14}$

Explain what he has done incorrectly and work out the correct answer.

Question 10: Work out the perimeter of this rectangle.



Question 11: The distance from Newtown to Milton is  $7\frac{2}{3}$  miles.

The distance from Milton to Redville is  $2\frac{2}{5}$  miles

Work out the distance from Newtown to Redville.



# Problem Solving

- 1 Rewrite each pair of fractions so that they have the same denominator as each other.

(a)  $\frac{1}{5}$     $\frac{1}{10}$

(b)  $\frac{1}{5}$     $\frac{1}{3}$

(c)  $\frac{2}{5}$     $\frac{3}{4}$

(d)  $\frac{7}{3}$     $\frac{7}{8}$

(e)  $\frac{1}{8}$    1

(f)  $\frac{1}{8}$    2

- 5 Use this empty number line to show why the following calculation is correct.

$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$



- 2 Calculate the following, simplifying your answer fully:

(a)  $\frac{3}{5} + \frac{2}{3}$

(b)  $\frac{2}{3} + \frac{1}{6}$

(c)  $\frac{3}{4} + \frac{4}{5}$

(d)  $\frac{5}{4} + 3$

(e)  $1\frac{1}{3} + 1\frac{1}{3}$

(f)  $1\frac{1}{3} + 2\frac{1}{4}$

- 6 Investigate the following sequence of calculations.

$$\frac{1}{2} + \frac{1}{4}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$$

What do you notice about your answers?

Write down the answer to the calculation below, without working:

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \dots + \frac{1}{1024}$$

- 3 Below is an addition grid. Circle the answers which are incorrect.

+	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{2}{12}$	$\frac{8}{15}$
$\frac{1}{4}$	$\frac{7}{12}$	$\frac{1}{2}$	$\frac{2}{9}$
$\frac{1}{5}$	$\frac{3}{15}$	$\frac{9}{20}$	$\frac{2}{10}$

- 7 Create 3 pairs of different fractions which sum to  $\frac{3}{5}$

$$\boxed{\phantom{00}} + \boxed{\phantom{00}} = \frac{3}{5}$$

$$\boxed{\phantom{00}} + \boxed{\phantom{00}} = \frac{3}{5}$$

$$\boxed{\phantom{00}} + \boxed{\phantom{00}} = \frac{3}{5}$$

- 4 I win some prize money in a competition.

I give  $\frac{2}{7}$  of my money to my sister and give  $\frac{1}{3}$  of my money to my brother. What fraction of the money do I have left?

- 8 Redo this question using a more efficient strategy.

$$\frac{3}{5} + \frac{3}{10} = \frac{3}{5} + \frac{3}{10} =$$

$$= \frac{30}{30} + \frac{15}{30} =$$

$$= \frac{45}{30} =$$

$$= \frac{9}{10}$$



# Problem Solving

Use the digits 1-6 once each so the answer is an integer

$$\square + \frac{\square}{7} + \square + \frac{\square}{7} + \frac{\square}{7}$$

# Problem Solving

Fill in the missing fractions in these *magic squares*.

In each square the total along every column, every row and both diagonals is the same.

Different squares have different totals. Write all the fractions in their simplest forms.

1

$\frac{4}{15}$		
$\frac{1}{5}$	$\frac{1}{3}$	
$\frac{8}{15}$		

2

$\frac{1}{10}$	$\frac{1}{4}$	$\frac{1}{25}$
	$\frac{13}{100}$	

3

$1\frac{2}{9}$		
	1	$\frac{5}{9}$
		$\frac{7}{9}$

4

5		
$6\frac{2}{3}$	$4\frac{1}{3}$	1

5

	$1\frac{4}{7}$	
	1	
	$\frac{3}{7}$	$1\frac{1}{7}$

6

		5
	$6\frac{1}{2}$	
8		11

## Fluency Practice

Question 1: Work out each of the following multiplications.  
Give each answer in its simplest form.

(a)  $\frac{1}{2} \times \frac{1}{5}$

(b)  $\frac{1}{2} \times \frac{3}{4}$

(c)  $\frac{1}{4} \times \frac{3}{5}$

(d)  $\frac{1}{3} \times \frac{1}{3}$

(e)  $\frac{5}{6} \times \frac{1}{2}$

(f)  $\frac{3}{4} \times \frac{1}{4}$

(g)  $\frac{2}{3} \times \frac{1}{7}$

(h)  $\frac{5}{8} \times \frac{1}{3}$

(i)  $\frac{2}{3} \times \frac{1}{2}$

(j)  $\frac{1}{3} \times \frac{3}{4}$

(k)  $\frac{3}{10} \times \frac{1}{2}$

(l)  $\frac{2}{5} \times \frac{1}{4}$

(m)  $\frac{2}{7} \times \frac{3}{4}$

(n)  $\frac{5}{7} \times \frac{1}{10}$

(o)  $\frac{7}{12} \times \frac{2}{3}$

(p)  $\frac{6}{7} \times \frac{2}{3}$

(q)  $\frac{6}{7} \times \frac{2}{9}$

(r)  $\frac{3}{10} \times \frac{5}{6}$

(s)  $\frac{6}{15} \times \frac{3}{4}$

(t)  $\frac{3}{5} \times \frac{11}{15}$

(u)  $\frac{9}{20} \times \frac{10}{11}$

(v)  $\frac{21}{30} \times \frac{2}{3}$

(w)  $\frac{12}{25} \times \frac{5}{8}$

(x)  $\frac{8}{9} \times \frac{3}{16}$

# Intelligent Practice

Calculate:

1)  $\frac{2}{3} \times \frac{1}{10}$

10)  $\frac{2}{2} \times \frac{3}{3}$

2)  $\frac{1}{3} \times \frac{1}{10}$

11)  $\frac{2}{3} \times \frac{1}{3}$

3)  $\frac{4}{3} \times \frac{1}{10}$

12)  $\frac{2}{3} \times \frac{10}{3}$

4)  $\frac{4}{3} \times \frac{10}{10}$

13)  $\frac{2}{3} \times \frac{100}{3}$

5)  $\frac{4}{3} \times \frac{2}{2}$

14)  $\frac{2}{3} \times \frac{3}{100}$

6)  $\frac{4}{3} \times \frac{2}{1}$

15)  $\frac{2}{7} \times \frac{7}{100}$

7)  $\frac{4}{3} \times \frac{3}{1}$

16)  $\frac{2}{37} \times \frac{37}{100}$

8)  $\frac{4}{3} \times \frac{3}{4}$

9)  $\frac{2}{3} \times \frac{3}{2}$

# More-Same-Less – Fraction Multiplication

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

		Value of the common denominator		
		Less	Same	More
Value of the result	More			
	Same		$\frac{5}{7} \times \frac{4}{3}$	
	Less			

By Simon Curtis  
Bitterne Park School

## Problem Solving

$$\frac{1}{a} \times \frac{1}{b} + \frac{c}{d} \times \frac{1}{e} + \frac{f}{g} \times \frac{1}{h} = 1$$

'a' 'b' ... to 'h' must be the digits 2 to 9  
used once only

## Fluency Practice

**Question 2:** Work out the following multiplications  
Give your answers as simplified fractions.  
If any answers are top heavy fractions, write as mixed numbers.

(a)  $\frac{1}{5} \times 3$

(b)  $7 \times \frac{1}{8}$

(c)  $\frac{1}{10} \times 4$

(d)  $30 \times \frac{1}{2}$

(e)  $8 \times \frac{3}{4}$

(f)  $\frac{2}{3} \times 12$

(g)  $5 \times \frac{1}{3}$

(h)  $8 \times \frac{2}{5}$

(i)  $4 \frac{4}{5} \times 20$

(j)  $\frac{2}{7} \times 8$

(k)  $8 \times \frac{5}{4}$

(l)  $1 \frac{1}{5} \times 360$

## Fluency Practice

Question 3: Work out the following divisions.

Give your answers as simplified fractions.

If any answers are top heavy fractions, write as mixed numbers.

(a)  $1\frac{2}{3} \times \frac{1}{4}$

(b)  $2\frac{2}{5} \times 1\frac{1}{4}$

(c)  $3\frac{3}{4} \times 1\frac{1}{2}$

(d)  $2\frac{1}{2} \times \frac{7}{10}$

(e)  $1\frac{1}{4} \times 3\frac{1}{3}$

(f)  $1\frac{2}{3} \times 1\frac{1}{4}$

(g)  $4\frac{3}{5} \times 1\frac{2}{3}$

(h)  $1\frac{2}{11} \times \frac{8}{9}$

(i)  $2\frac{5}{6} \times 2\frac{1}{5}$

(j)  $1\frac{1}{9} \times 3\frac{3}{10}$

(k)  $3\frac{1}{8} \times 2\frac{1}{2}$

(l)  $2\frac{6}{7} \times 3\frac{1}{5}$



# Intelligent Practice

Calculate:

1)  $1\frac{1}{2} \times \frac{1}{4}$

10)  $4\frac{1}{5} \times 1\frac{4}{5}$

2)  $\frac{1}{4} \times 1\frac{1}{2}$

11)  $4\frac{1}{5} \times 1\frac{4}{7}$

3)  $\frac{3}{4} \times 1\frac{1}{2}$

12)  $4\frac{1}{5} \times 2\frac{1}{7}$

4)  $2\frac{1}{2} \times \frac{3}{4}$

5)  $2\frac{1}{2} \times \frac{3}{5}$

6)  $2\frac{1}{2} \times \frac{4}{5}$

7)  $2\frac{1}{3} \times \frac{4}{5}$

8)  $4\frac{1}{3} \times \frac{4}{5}$

9)  $4\frac{1}{3} \times 1\frac{4}{5}$

# Problem Solving

## mixed number multiplying

$$\begin{array}{r} 3 \\ 6 \\ 1 \end{array} \times \begin{array}{r} 3 \\ 5 \\ 4 \\ 2 \end{array} =$$

- the left hand-side must use all of the digits, 1 to 6
  - the two fractions must be proper fractions (i.e. less than 1)
  - the fractions could cancel down – that doesn't matter
- (1) what is the smallest number that can be made? (smaller than  $4\frac{1}{3}$  )
  - (2) what is the largest number that can be made? (larger than  $36\frac{1}{4}$  )
  - (3) how can these whole numbers be made?

(a)  $\frac{\square}{\square} \times \frac{3}{\square} = 6$

(b)  $\frac{6}{\square} \times \frac{1}{\square} = 12$

(c)  $\frac{\square}{\square} \times \frac{2}{6} = 14$

(d)  $\frac{\square}{\square} \times \frac{\square}{\square} = 28$

- (5) can you find *two* ways to make  $20\frac{4}{5}$  ?
- (6) can you find *two* ways to make  $14\frac{17}{20}$  ?

# Intelligent Practice

Calculate:

1)  $\frac{2}{9} \times \frac{3}{4}$

10)  $3\frac{3}{8} \times \frac{16}{15}$

2)  $\frac{2}{9} \times \frac{3}{8}$

11)  $3\frac{3}{8} \times 1\frac{1}{15}$

3)  $\frac{4}{9} \times \frac{3}{16}$

12)  $3\frac{3}{8} \times 1\frac{2}{30}$

4)  $\frac{4}{27} \times \frac{3}{16}$

5)  $\frac{4}{27} \times \frac{9}{16}$

6)  $\frac{8}{27} \times \frac{9}{16}$

7)  $\frac{8}{27} \times \frac{15}{16}$

8)  $\frac{16}{27} \times \frac{15}{16}$

9)  $\frac{27}{8} \times \frac{16}{15}$

## Extension

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

$$\frac{1}{7} \times \frac{7}{3}$$

$$\frac{1}{7} \times \frac{7}{4}$$

$$\frac{3}{7} \times \frac{7}{8}$$

$$\frac{3}{7} \times \frac{14}{15}$$

$$\frac{3}{7} \times \frac{21}{15}$$

$$\frac{9}{21} \times \frac{14}{21}$$

## Extension

fraction multiplying, with cancelling

$$(1) \quad \frac{2}{3} \times \frac{3}{4}$$

$$(2) \quad \frac{4}{5} \times \frac{5}{6}$$

$$(3) \quad \frac{5}{6} \times \frac{9}{10}$$

$$(4) \quad \frac{6}{7} \times \frac{14}{15}$$

$$(5) \quad \frac{8}{9} \times \frac{27}{28}$$

$$(6) \quad \frac{6}{7} \times \frac{35}{36}$$

$$(7) \quad \frac{14}{15} \times \frac{20}{21}$$

$$(8) \quad \frac{11}{12} \times \frac{21}{22}$$

$$(9) \quad \frac{24}{25} \times \frac{15}{16}$$

$$(10) \quad \frac{33}{34} \times \frac{17}{18}$$

$$(11) \quad \frac{32}{33} \times \frac{15}{16}$$

$$(12) \quad \frac{51}{52} \times \frac{16}{17}$$

$$(13) \quad \frac{34}{35} \times \frac{50}{51}$$

$$(14) \quad \frac{56}{57} \times \frac{27}{28}$$

$$(15) \quad \frac{54}{55} \times \frac{44}{45}$$

$$(16) \quad \frac{48}{49} \times \frac{63}{64}$$

you should find that the results fit an overall rule

can you find other examples fitting this pattern?


# Extension

Question 1: Work out  $\frac{4}{5} \times 1\frac{1}{2} \times \frac{7}{8}$

Question 2: Work out the missing number  $\square \div \frac{7}{15} = \frac{2}{3}$

Question 3: Find the area of this rectangle. Include suitable units.

$\frac{9}{10} \text{ cm}$



$\frac{1}{4} \text{ cm}$

Question 4: Alexis has a pet dog, Maxi.  
 Each day, Maxi eats  $\frac{2}{3}$  of a can of dog food.  
 Alexis is buying dog food for one week.  
 How many cans of dog food should Alexis buy?



Question 5: Kelly spends  $\frac{1}{4}$  of her savings on driving lessons.  
 Kelly then spends  $\frac{2}{3}$  of her remaining savings on a new car.  
 What fraction of her savings has Kelly spent?

Question 6: Work out  $\frac{9}{10} + \left(\frac{5}{7}\right)^2$

Question 7: A wall measures  $3\frac{3}{4} \text{ m}$  by  $4\frac{1}{3} \text{ m}$   
 Each can of paint cover  $2.5\text{m}^2$  and costs £5.50  
 Work out the cost of painting the wall.



Question 8: Callum has completed his maths homework.  
 Can you spot any mistakes?

Work out

$$\frac{1}{3} \times \frac{1}{6}$$

$$\frac{2}{18} = \frac{1}{9}$$

Work out

$$1\frac{3}{10} \times 2\frac{1}{2}$$

$$\frac{13}{10} \times \frac{5}{2} = \frac{75}{20}$$

$$60\frac{15}{20}$$

$$60\frac{3}{4}$$

# Fluency Practice

Match the cards to their answers.  
Remember, fractions might be simplified!  
Record your results in the table (the cards have letters).


A.  $\frac{3}{4} \times 24$

B.  $7 \times \frac{2}{3}$

C.  $\frac{12}{24} \times \frac{40}{80}$

D.  $18 \times \frac{2}{3}$

E.  $\frac{2}{3} \times \frac{1}{8}$

F.  $\frac{5}{6} \times 6$

G.  $\frac{5}{4} \times \frac{3}{6}$

H.  $\frac{5}{4} \times 8$

I.  $\frac{3}{15} \times 20$

J.  $\frac{4}{16} \times \frac{30}{120}$

K.  $\frac{1}{6} \times \frac{1}{3}$

L.  $\frac{18}{4} \times \frac{3}{18}$

M.  $\frac{1}{4} \times \frac{1}{5} \times 5$

N.  $\frac{3}{4} \times \frac{1}{3} \times 8$

$\frac{1}{4}$

5

4

$\frac{3}{4}$

$\frac{1}{18}$

10

$\frac{14}{3}$

12

$\frac{1}{16}$

18

$\frac{2}{24}$

$\frac{5}{8}$

2

$\frac{1}{4}$

# Intelligent Practice

Calculate:

1)  $\left(\frac{2}{3}\right)^2$

2)  $\left(\frac{3}{4}\right)^2$

3)  $\left(\frac{3}{8}\right)^2$

4)  $\left(\frac{4}{5}\right)^2$

5)  $\left(\frac{14}{15}\right)^2$

6)  $\sqrt{\frac{1}{4}}$

7)  $\sqrt{\frac{9}{16}}$

8)  $\sqrt{\frac{25}{144}}$

9)  $\sqrt{\frac{81}{100}}$

10)  $\sqrt{\frac{196}{225}}$



## Fluency Practice

**Question 1:** Find the reciprocal of each of the following

(a) 2

(b)  $1\frac{1}{4}$

(c)  $2\frac{2}{3}$

(d)  $3\frac{3}{10}$

(e)  $5\frac{5}{2}$

(f)  $1\frac{1}{3}$

(g) 5

(h)  $4\frac{4}{5}$

(i)  $2\frac{2}{9}$

(j)  $20\frac{20}{19}$

(k)  $1\frac{1}{12}$

(l)  $13\frac{13}{8}$

(m)  $4\frac{4}{3}$

(n) 1

**Question 2:** Find the reciprocal of each of the following

(a)  $1\frac{1}{2}$

(b)  $1\frac{7}{10}$

(c)  $2\frac{1}{3}$

(d)  $4\frac{2}{3}$

(e)  $1\frac{4}{9}$

(f)  $6\frac{5}{6}$

# Fluency Practice

**tWO NUMBERS THAT  
MULTIPLY TOGETHER TO MAKE  
1 ARE CALLED  
RECIPROCAIS**



The reciprocal of  $\frac{2}{3}$  is



The reciprocal of  $\frac{4}{5}$  is



The reciprocal of  $\frac{1}{8}$  is

$$\frac{10}{1} = \frac{\square}{\square}$$



The reciprocal of  $\frac{1}{10}$  is



The reciprocal of  $\frac{1}{7}$  is



The reciprocal of 7 is



The reciprocal of 9 is

$$\frac{2}{6} \times \frac{\square}{\square} = \frac{12}{12}$$

$$\frac{12}{12} = \frac{\square}{\square}$$

$$\frac{12}{1} \times \frac{1}{12} = \frac{\square}{\square}$$

$$\frac{2}{6} \times \frac{\square}{\square} = 1$$

$$\frac{3}{4} \times \frac{\square}{\square} = 1$$

$$\frac{5}{8} \times \frac{\square}{\square} = 1$$

$$\frac{3}{4} \times \frac{\square}{\square} = \frac{6}{12}$$

$$\frac{2}{3} \times \frac{\square}{\square} = \frac{8}{9}$$

$$\frac{2}{5} \times \frac{\square}{8} = \frac{12}{\square}$$

$$\frac{2}{7} \times \frac{\square}{\square} = \frac{7}{2}$$

$$\frac{3}{5} \times \frac{\square}{3} = \frac{\square}{\square}$$

## Extension

Question 1: Find the missing numbers

(a)  $\square \times \frac{1}{4} = 1$

(b)  $\square \times 6 = 1$

(c)  $\frac{3}{4} \times \frac{4}{3} = \square$

(d)  $\frac{2}{9} \times \square = 1$

Question 2: Michael says that the reciprocal of a number is always larger than the number. Show Michael is wrong.

Question 3: Helen is thinking of a number. She then writes the reciprocal of the number. It is the same as her starting number. What number did Helen think of?

Question 4: What number does not have a reciprocal?

## Extension

Write down the reciprocal of these values, write them **in their simplest form**.

Easier

a)  $\frac{4}{9}$

b) 0.5

c) 1.5

d) 0.96

e)  $\frac{1}{6}$

Challenge

f)  $1\frac{1}{20}$

g) 0.125

h) **-8**

Fill in the blanks:

i)  $\frac{15}{[\ ]}$  is a reciprocal of  $2\frac{2}{3}$

j)  $\frac{[\ ]}{8}$  is a reciprocal of  $2\frac{2}{5}$

## Extension

Complete the sentence by filling in the blank

- a) The reciprocal of \_\_\_ is  $\frac{1}{7}$
- b) The reciprocal of \_\_\_ is 5
- c) The reciprocal of \_\_\_ is  $1\frac{1}{4}$
- d) The reciprocal of \_\_\_ is  $2\frac{3}{5}$
- e) The reciprocal of \_\_\_ is 0.7
- f) The reciprocal of \_\_\_ is 0.6
- g) The reciprocal of \_\_\_ is 1.3
- h) The reciprocal of \_\_\_ is undefined

Find the reciprocal of

- a) 4
- b)  $\frac{1}{3}$
- c)  $\frac{4}{5}$
- d)  $\frac{7}{3}$
- e)  $1\frac{1}{2}$
- f) 0.5
- g) 1.2
- h) 0.4
- i) 0.9

# Extension

1. Fill in the blanks:

a.  $\frac{1}{2} \times \frac{2}{1} = \frac{2}{2} = 1$

b.  $\frac{1}{4} \times \frac{4}{1} = \frac{\square}{\square} = 1$

c.  $\frac{1}{5} \times \frac{5}{1} = \frac{\square}{\square} = \square$

d.  $\frac{5}{1} \times \frac{1}{5} = \frac{\square}{\square} = \square$

e.  $\frac{7}{1} \times \frac{\square}{\square} = \frac{7}{7} = 1$

f.  $\frac{\square}{\square} \times \frac{1}{11} = \frac{\square}{\square} = 1$

g.  $\frac{2}{5} \times \frac{5}{2} = \frac{10}{\square} = 1$

h.  $\frac{5}{3} \times \frac{3}{5} = \frac{\square}{\square} = 1$

i.  $\frac{7}{4} \times \frac{4}{7} = \frac{\square}{\square} = \square$

j.  $\frac{\square}{\square} \times \frac{5}{11} = \frac{\square}{\square} = 1$

k.  $\frac{2}{\square} \times \frac{12}{\square} = \frac{24}{\square} = 1$

l.  $\frac{12}{\square} \times \frac{2}{\square} = \frac{\square}{24} = 1$

m.  $\frac{\square}{6} \times \frac{6}{\square} = \frac{24}{\square} = 1$

n.  $\frac{3}{\square} \times \frac{\square}{3} = \frac{24}{\square} = 1$

o.  $\frac{\square}{5} \times \frac{5}{\square} = \frac{\square}{\square} = 1$

p.  $\frac{-2}{\square} \times \frac{12}{\square} = \frac{-24}{\square} = \square$

q.  $\frac{-2}{\square} \times \frac{-12}{\square} = \frac{\square}{\square} = \square$

r.  $\frac{-2}{\square} \times \frac{12}{\square} = \frac{-24}{\square} = 1$

s.  $\frac{a}{b} \times \frac{\square}{\square} = \frac{\square}{\square} = 1$

t.  $\frac{a}{\square} \times \frac{\square}{a} = \frac{\square}{\square} = 1$

2. Write down the multiplicative inverse of each number:

a. 3

k. -8

b. 7

l.  $-\frac{1}{4}$

c.  $\frac{1}{3}$

m.  $\frac{1}{-3}$

d.  $\frac{1}{5}$

n.  $-\frac{1}{5}$

e.  $\frac{2}{3}$

o.  $\frac{2}{-3}$

f.  $\frac{4}{7}$

p. 0.2

g.  $\frac{9}{2}$

q. 0.75

h.  $\frac{11}{3}$

r. 0.6

i. 1

s. a

j. -3

t. 0

## Fluency Practice

**Question 1:** Work out the following divisions.

Give your answers as simplified fractions.

If any answers are top heavy fractions, write as mixed numbers.

(a)  $\frac{1}{5} \div \frac{2}{3}$

(b)  $\frac{3}{4} \div \frac{4}{5}$

(c)  $\frac{1}{2} \div \frac{7}{8}$

(d)  $\frac{2}{3} \div \frac{5}{6}$

(e)  $\frac{1}{10} \div \frac{4}{9}$

(f)  $\frac{6}{11} \div \frac{5}{6}$

(g)  $\frac{2}{5} \div \frac{13}{15}$

(h)  $\frac{3}{8} \div \frac{7}{9}$

(i)  $\frac{3}{5} \div \frac{1}{2}$

(j)  $\frac{7}{9} \div \frac{2}{3}$

(k)  $\frac{8}{15} \div \frac{7}{10}$

(l)  $\frac{9}{10} \div \frac{1}{3}$

(m)  $\frac{5}{6} \div \frac{3}{4}$

(n)  $\frac{13}{20} \div \frac{8}{11}$

(o)  $\frac{4}{17} \div \frac{3}{16}$

(p)  $\frac{5}{7} \div \frac{10}{19}$

# Intelligent Practice

Calculate:

1)  $\frac{1}{4} \div \frac{1}{3}$

10)  $\frac{6}{6} \div \frac{1}{2}$

2)  $\frac{1}{4} \div \frac{1}{5}$

11)  $\frac{6}{6} \div \frac{1}{3}$

3)  $\frac{1}{4} \div \frac{1}{8}$

12)  $\frac{5}{6} \div \frac{1}{3}$

4)  $\frac{1}{4} \div \frac{3}{8}$

13)  $\frac{5}{6} \div \frac{3}{3}$

5)  $\frac{1}{4} \div \frac{3}{7}$

14)  $\frac{1}{6} \div \frac{3}{3}$

6)  $\frac{1}{4} \div \frac{3}{6}$

15)  $\frac{1}{6} \div \frac{8}{8}$

7)  $\frac{3}{6} \div \frac{1}{4}$

16)  $\frac{1}{6} \div \frac{8}{1}$

8)  $\frac{5}{6} \div \frac{1}{4}$

9)  $\frac{6}{6} \div \frac{1}{4}$



# More-Same-Less – Fraction Division

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

		Value of the common denominator		
		Less	Same	More
Value of the result	More			
	Same		$\frac{5}{3} \div \frac{2}{5}$	
	Less			

By Simon Curtis  
Bitterne Park School

## Fluency Practice

**Question 2:** Work out the following divisions

Give your answers as simplified fractions.

If any answers are top heavy fractions, write as mixed numbers.

(a)  $\frac{3}{4} \div 2$

(b)  $\frac{4}{7} \div 8$

(c)  $\frac{11}{20} \div 3$

(d)  $\frac{9}{40} \div 5$

(e)  $4 \div \frac{2}{3}$

(f)  $2 \div \frac{3}{4}$

(g)  $12 \div \frac{2}{3}$

(h)  $5 \div \frac{2}{9}$

# Intelligent Practice

Calculate:

1)  $\frac{2}{5} \div 3$

2)  $\frac{3}{5} \div 3$

3)  $\frac{5}{3} \div 3$

4)  $\frac{3}{6} \div 3$

5)  $\frac{5}{6} \div 3$

6)  $\frac{10}{12} \div 3$

7)  $\frac{10}{12} \div 30$

8)  $\frac{5}{6} \div 30$

9)  $\frac{5}{6} \div 15$

10)  $\frac{10}{6} \div 15$

11)  $\frac{8}{6} \div 15$

Calculate:

1)  $3 \div \frac{2}{5}$

2)  $3 \div \frac{3}{5}$

3)  $3 \div \frac{5}{3}$

4)  $3 \div \frac{3}{6}$

5)  $3 \div \frac{5}{6}$

6)  $3 \div \frac{10}{12}$

7)  $30 \div \frac{10}{12}$

8)  $30 \div \frac{5}{6}$

9)  $15 \div \frac{5}{6}$

10)  $15 \div \frac{10}{6}$

11)  $15 \div \frac{8}{6}$

## Fluency Practice

**Question 3:** Work out the following divisions.  
Give your answers as simplified fractions.  
If any answers are top heavy fractions, write as mixed numbers.

(a)  $\frac{2}{3} \div 1\frac{4}{5}$

(b)  $1\frac{1}{2} \div 1\frac{9}{10}$

(c)  $2\frac{3}{7} \div \frac{1}{2}$

(d)  $2\frac{1}{3} \div 5\frac{1}{2}$

(e)  $3 \div 2\frac{1}{8}$

(f)  $4\frac{1}{3} \div 2\frac{9}{10}$

(g)  $6\frac{5}{6} \div 2$

(h)  $1\frac{5}{12} \div 2\frac{2}{11}$

# Intelligent Practice

Calculate:

1)  $\frac{2}{3} \div 2\frac{1}{5}$

9)  $-\frac{3}{5} \div 2\frac{3}{4}$

2)  $1\frac{2}{3} \div 2\frac{1}{5}$

10)  $\frac{4}{5} \div -2\frac{4}{15}$

3)  $2\frac{2}{3} \div 2\frac{1}{5}$

11)  $-2\frac{4}{5} \div -2\frac{4}{15}$

4)  $2\frac{2}{3} \div 1\frac{1}{5}$

12)  $-2\frac{4}{5} \div -3\frac{8}{15}$

5)  $\frac{2}{5} \div 2\frac{1}{3}$

13)  $\frac{2}{7} \div 2\frac{2}{7}$

6)  $3\frac{2}{5} \div 2\frac{1}{3}$

14)  $2\frac{2}{7} \div -2\frac{2}{7}$

7)  $3\frac{2}{5} \div 3\frac{1}{3}$

15)  $-4\frac{2}{7} \div -2\frac{2}{7}$

8)  $\frac{2}{5} \div 3\frac{2}{3}$

16)  $-4\frac{2}{7} \div -1\frac{2}{7}$

# Fluency Practice

Complete these calculations with fractions from those listed on the right.  
Remember, some fractions may have been simplified.

- 8

$\frac{1}{8}$

25

$1\frac{3}{5}$

$\frac{4}{3}$

$\frac{2}{21}$

6

$\frac{1}{16}$

7

$2\frac{2}{3}$

$\frac{3}{4}$

$\frac{6}{25}$

$\frac{3}{5}$

$\frac{2}{3}$

$1\frac{34}{54}$

$\frac{5}{3}$

$\frac{3}{4}$

15

$16\frac{2}{3}$

$\frac{10}{3}$

$\frac{1}{3}$

$\frac{5}{8}$

- |    |                |   |                |   |  |  |
|----|----------------|---|----------------|---|--|--|
| A) | $\frac{1}{6}$  | ÷ | $\frac{1}{8}$  | = |  |  |
| B) | $\frac{2}{3}$  | ÷ | $\frac{1}{5}$  | = |  |  |
| C) | $\frac{1}{4}$  | ÷ | $\frac{2}{6}$  | = |  |  |
| D) | $\frac{1}{2}$  | ÷ | $\frac{4}{5}$  | = |  |  |
| E) | $\frac{1}{3}$  | ÷ | 1              | = |  |  |
| F) | $\frac{5}{3}$  | ÷ | $\frac{1}{9}$  | = |  |  |
| G) | $\frac{2}{3}$  | ÷ | $\frac{2}{5}$  | = |  |  |
| H) | $\frac{3}{2}$  | ÷ | $\frac{5}{2}$  | = |  |  |
| I) | $\frac{1}{4}$  | ÷ | 2              | = |  |  |
| J) | $\frac{2}{7}$  | ÷ | 3              | = |  |  |
| K) | $\frac{2}{8}$  | ÷ | 4              | = |  |  |
| L) | $\frac{1}{6}$  | ÷ | $\frac{1}{48}$ | = |  |  |
| M) | 5              | ÷ | $\frac{1}{5}$  | = |  |  |
| N) | 9              | ÷ | $\frac{3}{2}$  | = |  |  |
| O) | 12             | ÷ | 18             | = |  |  |
| P) | 10             | ÷ | $\frac{3}{5}$  | = |  |  |
| Q) | 1              | ÷ | $\frac{3}{8}$  | = |  |  |
| R) | 1              | ÷ | $\frac{5}{8}$  | = |  |  |
| S) | $\frac{1}{4}$  | ÷ | $\frac{1}{10}$ | = |  |  |
| T) | $\frac{7}{2}$  | ÷ | $4\frac{2}{3}$ | = |  |  |
| U) | $1\frac{1}{5}$ | ÷ | 5              | = |  |  |
| V) | $1\frac{1}{4}$ | ÷ | $\frac{5}{3}$  | = |  |  |
| W) | $2\frac{1}{3}$ | ÷ | $\frac{1}{3}$  | = |  |  |
| X) | $1\frac{5}{6}$ | ÷ | $1\frac{1}{8}$ | = |  |  |

## Extension

Question 1: Work out the missing number

$$\frac{9}{11} \times \square = \frac{3}{4}$$

Question 2: Work out

(a)  $\frac{4}{5} \div \frac{3}{10} \div \frac{1}{8}$

(b)  $\frac{7}{9} + \frac{1}{2} \div \frac{3}{5}$

Question 3: James shares  $\frac{5}{8}$  of a cake between 6 people.

What fraction of the cake do they each receive?



Question 4: John has 12 cans of dog food.

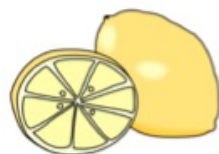
He has two dogs and he gives each dog  $\frac{2}{3}$  of a can of dog food each day.

Does he have enough dog food to last one week?

Question 5: Alisha has  $\frac{7}{8}$  litres of lemonade.

She is pouring glasses that each contain  $\frac{1}{5}$  litres.

How many full glasses can she pour?



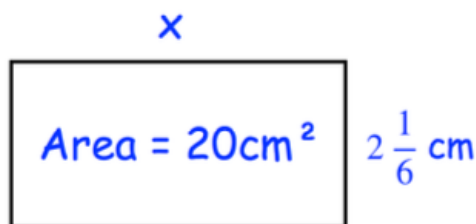
Question 6: Helen is cutting lengths of string from a roll that is  $9\frac{1}{3}$  metres long.

Each length of string is  $\frac{1}{9}$  metres long.

How many lengths of string can Helen cut from the roll?

# Extension

Question 7: Shown is a rectangle.  
Find the value of  $x$



Question 8: Lee has completed his homework.  
Can you spot any mistakes?

Work out

$$\frac{2}{3} \div \frac{8}{11}$$

Give your answer as a fraction in its simplest form.

$$\begin{aligned} \frac{2}{3} \times \frac{8}{11} \\ = \frac{16}{33} \end{aligned}$$

Work out

$$1\frac{4}{7} \div 1\frac{1}{4}$$

Give your answer as a mixed number.

$$\begin{aligned} \frac{11}{7} \div \frac{5}{4} \\ = \frac{11}{7} \times \frac{4}{5} = \frac{44}{35} \end{aligned}$$



# Problem Solving

1 Calculate the following, simplifying your answer fully:

(a)  $\frac{1}{5} \times \frac{3}{4}$

(b)  $\frac{2}{5} \times \frac{1}{6}$

(c)  $8 \times \frac{3}{4}$

(d)  $1\frac{1}{5} \times 2\frac{11}{12}$

2 Write down the reciprocal of each of the following:

(a)  $\frac{1}{7}$

(b) 5

(c)  $\frac{3}{7}$

(d)  $1\frac{2}{7}$

3 Calculate the following, simplifying your answer fully:

(a)  $\frac{3}{5} \div \frac{2}{5}$

(b)  $\frac{4}{5} \div \frac{2}{7}$

(c)  $3 \div \frac{1}{7}$

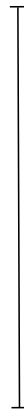
(d)  $\frac{1}{7} \div 3$

(e)  $1\frac{1}{3} \div \frac{1}{6}$

(f)  $2\frac{2}{5} \div 2\frac{1}{12}$

6 Use this empty number line to show why the following calculation is correct.

$$\frac{5}{6} \div \frac{1}{12} = 10$$



4 Using mental calculation, write the following calculations in ascending order:

$4 \div \frac{1}{4}$

$\frac{1}{4} \div 4$

$4 \div 4$

$\frac{1}{4} \div \frac{1}{4}$

$\frac{1}{4} \div \frac{1}{8}$

$\frac{1}{8} \div 4$

5 There is  $\frac{10}{11}$  of a cake leftover at a party. It is decided to share it between 5 people. What fraction of the cake does each of the people receive?

7 Investigate the following sequence of calculations. What pattern do you see in your answers?

$\frac{2}{5} \div \frac{1}{5}$

$\frac{3}{5} \div \frac{2}{5}$

$\frac{4}{5} \div \frac{3}{5}$

$\frac{5}{5} \div \frac{4}{5}$

Now try these:

$\frac{27}{71} \div \frac{19}{71}$

$\frac{a}{b} \div \frac{c}{b}$

8 Write fractions in each box to make the calculations true:

$\div$   = 1

$\div$   =  $\frac{1}{2}$

$\div$   =  $\frac{2}{9}$

9 Somebody claims that:

"Division makes things smaller"

Decide if this is always, sometimes or never true. Give some examples to support your decision.

# Fraction Addition

(show your steps)

practice makes perfect: fraction addition

1)

$$\frac{1}{5} + \frac{1}{10}$$

2)

$$\frac{1}{4} + \frac{1}{20}$$

3)

$$\frac{1}{2} + \frac{1}{6}$$

4)

$$\frac{1}{4} + \frac{1}{12}$$

5)

$$\frac{1}{6} + \frac{1}{18}$$

6)

$$\frac{1}{5} + \frac{1}{45}$$

7)

$$\frac{2}{3} + \frac{1}{6}$$

8)

$$\frac{3}{4} + \frac{1}{12}$$

9)

$$\frac{3}{7} + \frac{2}{5}$$

10)

$$\frac{2}{7} + \frac{3}{5}$$

11)

$$\frac{2}{25} + \frac{9}{10}$$

12)

$$\frac{17}{25} + \frac{3}{10}$$

13)

which is the smallest?

$$\frac{2}{3} + \frac{4}{5}$$

$$\frac{2}{4} + \frac{3}{5}$$

$$\frac{2}{5} + \frac{3}{4}$$

14)

work out

$$\frac{1}{2} + \frac{1}{4}$$

$$\frac{3}{4} + \frac{1}{8}$$

$$\frac{1}{2} + \frac{1}{6}$$

$$\frac{2}{3} + \frac{1}{4}$$

$$\frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{4}$$

$$\frac{1}{8}$$

$$\frac{1}{12}$$

$$\frac{1}{12}$$

$$\frac{1}{6}$$

15)

using triangular numbers, work out

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{10}$$

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15}$$

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \frac{1}{21}$$

$$\frac{1}{3} + \frac{1}{6} + \frac{1}{10} + \frac{1}{15} + \frac{1}{21} + \frac{1}{28}$$

# Fraction Addition

## practice makes perfect: fraction addition explorations

i) general rule

$$\frac{1}{2} + \frac{1}{3}$$

$$\frac{1}{10} + \frac{1}{15}$$

$$\frac{1}{12} + \frac{1}{18}$$

$$\frac{1}{14} + \frac{1}{21}$$

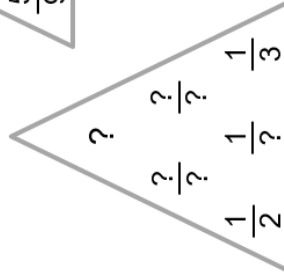
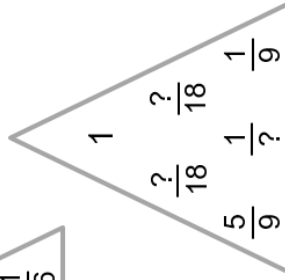
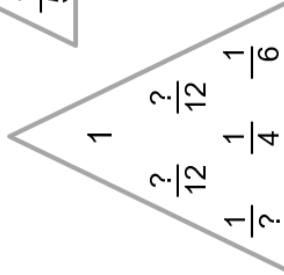
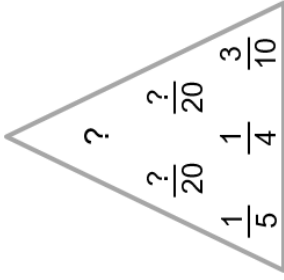
$$\frac{1}{20} + \frac{1}{30}$$

what is the pattern for these questions?

what is the pattern in the results?

try to explain the result

ii) addition pyramids



try to create a similar fraction pyramid, using fairly simple fractions

iii) generalising

$$\frac{3}{7} + \frac{1}{2}$$

$$\frac{5}{11} + \frac{1}{2}$$

$$\frac{2}{5} + \frac{1}{2}$$

$$\frac{4}{9} + \frac{1}{2}$$

what is the pattern for these questions?

what is the pattern in the results?

test that the rule works and try to explain the result

# Fraction Subtraction

## practice makes perfect: fraction subtraction

(show your steps)

1)  $\frac{3}{10} - \frac{1}{5}$

2)  $\frac{7}{10} - \frac{3}{5}$

3)  $\frac{1}{5} - \frac{3}{35}$

4)  $\frac{1}{10} - \frac{3}{70}$

5)  $\frac{4}{5} - \frac{1}{10}$

6)  $\frac{3}{4} - \frac{1}{20}$

7)  $\frac{6}{7} - \frac{4}{5}$

8)  $\frac{9}{10} - \frac{59}{70}$

9)  $\frac{13}{7} - \frac{5}{3}$

10)  $\frac{4}{3} - \frac{8}{7}$

11)  $\frac{6}{35} - \frac{1}{10}$

12)  $\frac{13}{35} - \frac{3}{10}$

13) work out

$$\frac{3}{4} - \frac{2}{3}$$

$$\frac{5}{6} - \frac{4}{5}$$

$$\frac{10}{11} - \frac{9}{10}$$

$$\frac{7}{8} - \frac{6}{7}$$

14)

work out the missing fractions

$$\frac{3}{4} - ? = \frac{1}{12}$$

$$\frac{3}{4} - ? = \frac{1}{28}$$

$$\frac{3}{4} - ? = \frac{1}{44}$$

$$\frac{3}{4} - ? = \frac{1}{60}$$

cancel down

15)

using 2, 3, 4 and 5  
which is the smallest?

$$\frac{4}{5} - \frac{2}{3}$$

$$\frac{3}{4} - \frac{2}{5}$$

$$\frac{3}{5} - \frac{2}{4}$$

# Fraction Subtraction

## practice makes perfect: fraction subtraction explorations

i) general rule

$$\frac{2}{5} - \frac{3}{10}$$

$$\frac{2}{5} - \frac{7}{20}$$

$$\frac{2}{5} - \frac{5}{15}$$

$$\frac{2}{5} - \frac{11}{30}$$

$$\frac{2}{5} - \frac{21}{55}$$

what is the pattern for these questions?

what is the pattern in the results?

try to explain the result

ii) fraction equations

$$(a) \frac{1}{3} + \frac{6}{n} = 1$$

$$(b) \frac{2}{5} + \frac{6}{n} = \frac{7}{10}$$

$$(c) \frac{3}{4} + \frac{6}{n} = \frac{11}{12}$$

$$(d) \frac{2}{3} + \frac{6}{n} = \frac{11}{12}$$

$$(e) \frac{2}{3} + \frac{6}{n} = \frac{8}{15}$$

try to create two similar fraction equations

iii) generalising

$$\frac{5}{6} - \frac{1}{3}$$

$$\frac{9}{14} - \frac{1}{7}$$

$$\frac{11}{18} - \frac{1}{9}$$

$$\frac{5}{6} - \frac{1}{3}$$

what is the pattern for these questions?

what is the pattern in the results?

test that the rule works

try to explain the result

# Multiplying Fractions

## practice makes perfect: fraction multiplication

(show your steps)

1)

$$\frac{3}{4} \times \frac{7}{5}$$

2)

$$\frac{5}{6} \times \frac{5}{4}$$

3)

$$\frac{7}{9} \times \frac{4}{3}$$

4)

$$\frac{4}{5} \times \frac{5}{6}$$

5)

$$\frac{3}{4} \times \frac{8}{9}$$

6)

$$1\frac{1}{3} \times 4\frac{1}{2}$$

7)

$$2\frac{2}{3} \times 2\frac{1}{4}$$

8)

$$\frac{7}{6} \times \frac{10}{21}$$

9)

$$\frac{8}{15} \times \frac{25}{24}$$

10)

$$\frac{3}{4} \times \frac{9}{7}$$

11)

$$\frac{3}{4} \times \frac{17}{13}$$

12)

$$\frac{3}{4} \times \frac{25}{19}$$

13)

below but close to a half

$$\frac{4}{5} \times \frac{2}{3}$$

$$\frac{3}{4} \times \frac{3}{4}$$

$$\frac{3}{4} \times \frac{5}{7}$$

$$\frac{3}{5} \times \frac{6}{7}$$

can you get any closer?

14)

find the missing fractions

$$\begin{array}{r} \square\square \times \square\square \\ \square\square \times \square\square \\ \hline \frac{2}{5} = \frac{5}{6} \end{array}$$

$$\begin{array}{r} \square\square \times \square\square \\ \square\square \times \square\square \\ \hline \frac{5}{8} = \frac{8}{15} \end{array}$$

15)

$$\frac{3}{5} \times ? \times 60 = 24$$

$$1\frac{1}{2} \times ? \times 60 = 25$$

$$1\frac{1}{2} \times ? \times 60 = 26$$

$$\frac{3}{4} \times ? \times 60 = 27$$

$$\frac{3}{5} \times ? \times 60 = 28$$

# Multiplying Fractions

## practice makes perfect: fraction multiplication explorations

### i) general rule (i)

(a)  $\frac{4}{3} \times \frac{1}{2}$

(b)  $\frac{6}{5} \times \frac{3}{4}$

(c)  $\frac{5}{4} \times \frac{2}{3}$

(d)  $\frac{7}{6} \times \frac{4}{5}$

(e)  $\frac{13}{12} \times \frac{10}{11}$

what pattern is there for these questions?

what pattern is there in the results?

try to explain the general rule

### ii) unitary fraction answers

(a)  $\frac{3}{4} \times \frac{2}{3} =$

(b)  $\frac{2}{4} \times \frac{1}{3} =$

(c)  $\frac{3}{6} \times \frac{2}{5} =$

(d)  $\frac{2}{3} \times \frac{1}{2} =$

(e)  $\frac{6}{10} \times \frac{5}{9} =$

try to create similar fraction multiplication sums with

$$\frac{a}{b} \times \frac{a-1}{b-1} = \frac{1}{n}$$

### iii) general rule (ii)

(a)  $\frac{4}{5} \times \frac{6}{5}$

(b)  $\frac{4}{5} \times \frac{11}{9}$

(c)  $\frac{4}{5} \times \frac{16}{13}$

(d)  $\frac{4}{5} \times \frac{21}{17}$

(e)  $\frac{4}{5} \times \frac{26}{21}$

what pattern is there for these questions?

what pattern is there in the results?

test the general rule

# Dividing Fractions

practice makes perfect: fraction division

(show your steps)

1)  $\frac{3}{8} \div \frac{1}{4}$

2)  $\frac{9}{10} \div \frac{3}{5}$

3)  $\frac{4}{5} \div \frac{6}{5}$

4)  $\frac{3}{4} \div \frac{9}{8}$

5)  $\frac{5}{2} \div \frac{8}{3}$

6)  $\frac{5}{6} \div \frac{8}{9}$

7)  $\frac{4}{5} \div \frac{6}{5}$

8)  $\frac{5}{8} \div \frac{15}{16}$

9)  $\frac{4}{5} \div \frac{9}{10}$

10)  $\frac{5}{6} \div \frac{15}{16}$

11)  $\frac{12}{13} \div \frac{25}{26}$

12)  $\frac{12}{13} \div \frac{51}{52}$

13) what are the missing fractions?

$\frac{1}{2} \div \frac{\square}{\square} = \frac{4}{5}$

$\frac{2}{3} \div \frac{\square}{\square} = \frac{4}{5}$

$\frac{3}{5} \div \frac{\square}{\square} = \frac{4}{5}$

$\frac{8}{9} \div \frac{\square}{\square} = \frac{4}{5}$

14) work out

$\frac{3}{4} \div \frac{15}{16} =$

$\frac{3}{4} \div \frac{9}{10} =$

$\frac{3}{4} \div \frac{7}{8} =$

find similar results  $\frac{4}{5} \div \frac{\square}{\square}$   
for

15)

using 2, 3, 4 and 5 (once only)

how do you make the given fraction?

$\frac{\square}{\square} \div \frac{\square}{\square}$

$= \frac{15}{8}$

two solutions

$\frac{\square}{\square} \div \frac{\square}{\square}$

$= \frac{10}{3}$

two solutions

$\frac{\square}{\square} \div \frac{\square}{\square}$

$= \frac{5}{6}$

two solutions



# Dividing Fractions

## practice makes perfect: fraction division families

### i) general rule (i)

(a)  $\frac{2}{3} \div \frac{3}{4}$

(b)  $\frac{2}{3} \div \frac{7}{10}$

(c)  $\frac{2}{3} \div \frac{5}{7}$

(d)  $\frac{2}{3} \div \frac{9}{13}$

(e)  $\frac{2}{3} \div \frac{33}{49}$

what is the pattern for these questions?

what is the pattern in the results?

try to explain the result

### ii) general rule (ii)

(a)  $\frac{16}{41} \div \frac{2}{5}$

(b)  $\frac{4}{11} \div \frac{2}{5}$

(c)  $\frac{12}{31} \div \frac{2}{5}$

(d)  $\frac{8}{21} \div \frac{2}{5}$

(e)  $\frac{20}{51} \div \frac{2}{5}$

what is the pattern for these questions?

what is the pattern in the results?

test that the rule works

### iii) general rule (iii)

(a)  $\frac{4}{5} \div \frac{5}{6}$

(b)  $\frac{8}{9} \div \frac{9}{10}$

(c)  $\frac{10}{11} \div \frac{11}{12}$

(d)  $\frac{6}{7} \div \frac{7}{8}$

(e)  $\frac{20}{21} \div \frac{21}{22}$

what is the pattern for these questions?

what is the pattern in the results?

test that the rule works

# Fluency Practice

Fill in the missing numbers in these grids. Write all the answers as mixed numbers with fractions in their lowest forms.

(horizontal number multiplied by vertical number)

×	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
$\frac{1}{4}$										
1			$1\frac{1}{2}$							
$1\frac{1}{2}$										
2										
$2\frac{1}{2}$										
3										
$3\frac{1}{2}$										
4										
$4\frac{1}{2}$										
5										

(horizontal number divided by vertical number each time)

÷	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
$\frac{1}{2}$	1									
1	$\frac{1}{2}$									
$1\frac{1}{2}$	$\frac{1}{3}$									
2										
$2\frac{1}{2}$										
3										
$3\frac{1}{2}$										
4										
$4\frac{1}{2}$										
5										

**Extra Task** Make up a number square like this with the fractions around the edge going up in  $\frac{1}{3}$ 's or  $\frac{1}{4}$ 's or some other fraction.

# Fluency Practice

Simplify your answers where possible.

Calculate

(a)  $\frac{1}{3} \times \frac{1}{4}$

(b)  $\frac{1}{3} \times \frac{2}{7}$

(c)  $\frac{1}{2} \times \frac{2}{9}$

(d)  $\frac{3}{4} \times \frac{2}{5}$

Calculate

(a)  $\frac{1}{5} \times 2$

(b)  $\frac{2}{11} \times 4$

(c)  $4 \times \frac{3}{15}$

(d)  $3 \times \frac{5}{18}$

Calculate

(a)  $\frac{2}{3} \div \frac{1}{3}$

(b)  $\frac{8}{9} \div \frac{2}{9}$

(c)  $\frac{1}{2} \div \frac{6}{7}$

(d)  $\frac{3}{4} \div \frac{8}{9}$

Calculate

(a)  $\frac{3}{5} \div 2$

(b)  $\frac{2}{3} \div 4$

(c)  $4 \div \frac{1}{2}$

(d)  $3 \div \frac{3}{8}$

Calculate, giving your answers in their simplest form:

(a)  $1\frac{2}{3} \times 2\frac{1}{5}$

(b)  $2\frac{3}{5} \times 1\frac{5}{6}$

(c)  $3\frac{1}{2} \times \frac{2}{5}$

(d)  $2\frac{1}{4} \times 3\frac{3}{10}$

(e)  $\frac{1}{8} \div 1\frac{1}{2}$

(f)  $2\frac{1}{4} \div \frac{1}{2}$

(g)  $3\frac{2}{5} \div 1\frac{3}{4}$

(h)  $2\frac{5}{6} \div 1\frac{2}{3}$

# Fluency Practice

- (a) Show that  $\frac{3}{4} \div \frac{15}{16} = \frac{4}{5}$
- (b) Show that  $\frac{23}{24} - \frac{3}{8} = \frac{7}{12}$
- (c) Show that  $\frac{5}{8} \div \frac{7}{12} = 1\frac{1}{14}$
- (d) Show that  $\frac{3}{4} + \frac{4}{5} = 1\frac{11}{20}$

- (a) Show that  $1\frac{1}{2} \div 1\frac{1}{4} = 1\frac{1}{5}$
- (b) Show that  $2\frac{1}{4} \div 3\frac{1}{2} = \frac{9}{14}$
- (c) Show that  $2\frac{5}{8} \div 1\frac{1}{6} = 2\frac{1}{4}$
- (d) Show that  $3\frac{1}{2} \times 2\frac{2}{3} = 9\frac{1}{3}$
- (e) Show that  $4\frac{2}{3} \div 3\frac{5}{9} = 1\frac{5}{16}$

- (a) Show that  $\frac{5}{9} + \frac{1}{6} = \frac{13}{18}$
- (b) Show that  $\frac{7}{8} - \frac{5}{6} = \frac{1}{24}$
- (c) Show that  $1\frac{2}{3} + 2\frac{3}{4} = 4\frac{5}{12}$
- (d) Show that  $5\frac{1}{4} - 1\frac{2}{3} = 3\frac{7}{12}$
- (e) Show that  $7\frac{1}{2} - 4\frac{2}{3} = 2\frac{5}{6}$

- (a) Show that  $2\frac{1}{3} \times \frac{5}{6} \times \frac{9}{10} = 1\frac{3}{4}$
- (b) Show that  $2\frac{2}{3} - 1\frac{1}{4} \div 1\frac{1}{8} = 1\frac{5}{9}$

# Fluency Practice

<p><b>A1</b> Show that:</p> $\frac{2}{3} + \frac{2}{5} = 1\frac{1}{15}$	<p><b>A2</b> Show that:</p> $\frac{3}{4} - \frac{1}{5} = \frac{11}{20}$	<p><b>A3</b> Show that:</p> $\frac{2}{5} \times \frac{3}{4} = \frac{3}{10}$	<p><b>A4</b> Show that:</p> $\frac{3}{5} + \frac{2}{3} = \frac{9}{10}$
<p><b>B1</b> Show that:</p> $2\frac{4}{5} + \frac{3}{7} = 3\frac{8}{35}$	<p><b>B2</b> Show that:</p> $3\frac{1}{3} - \frac{4}{7} = 2\frac{16}{21}$	<p><b>B3</b> Show that:</p> $2\frac{1}{6} \times \frac{3}{4} = 1\frac{5}{8}$	<p><b>B4</b> Show that:</p> $2\frac{2}{7} + \frac{3}{5} = 3\frac{17}{21}$
<p><b>C1</b> Show that:</p> $2\frac{1}{4} + 3\frac{5}{6} = 6\frac{1}{12}$	<p><b>C2</b> Show that:</p> $3\frac{3}{7} - 2\frac{2}{3} = \frac{16}{21}$	<p><b>C3</b> Show that:</p> $1\frac{2}{3} \times 2\frac{3}{7} = 4\frac{1}{21}$	<p><b>C4</b> Show that:</p> $3\frac{3}{5} + 1\frac{2}{3} = 2\frac{4}{25}$
<p><b>D1</b> Show that:</p> $\frac{3}{4} + \frac{2}{3} \times \frac{3}{7} = 1\frac{1}{28}$	<p><b>D2</b> Show that:</p> $\frac{4}{5} \times \left( \frac{3}{4} - \frac{1}{3} \right) = \frac{1}{3}$	<p><b>D3</b> Show that:</p> $\frac{3}{5} \times 2 + 1\frac{3}{7} = 2\frac{22}{35}$	<p><b>D4</b> Show that:</p> $1\frac{2}{5} \times \frac{3}{4} + \left( \frac{2}{3} \right)^2 = 2\frac{29}{80}$

# Fluency Practice

Simplify your answers where possible.

$$(a) \frac{1}{5} \times 2$$

$$(b) \frac{2}{11} \times 4$$

$$(c) 4 \times \frac{3}{15}$$

$$(d) 3 \times \frac{5}{18}$$

$$(a) \frac{1}{3} \times \frac{1}{4}$$

$$(b) \frac{1}{3} \times \frac{2}{7}$$

$$(c) \frac{1}{2} \times \frac{2}{9}$$

$$(d) \frac{3}{4} \times \frac{2}{5}$$

$$(e) \frac{2}{3} \times \frac{5}{9}$$

$$(f) \frac{5}{6} \times \frac{3}{4}$$

$$(a) \frac{3}{5} \div 2$$

$$(b) \frac{2}{3} \div 4$$

$$(c) 4 \div \frac{1}{2}$$

$$(d) 3 \div \frac{3}{8}$$

$$(a) \frac{2}{3} \div \frac{1}{3}$$

$$(b) \frac{8}{9} \div \frac{2}{9}$$

$$(c) \frac{1}{2} \div \frac{6}{7}$$

$$(d) \frac{3}{4} \div \frac{8}{9}$$

$$(e) \frac{1}{3} \div \frac{2}{5}$$

$$(f) \frac{5}{6} \div \frac{1}{4}$$

$$(a) \frac{7}{8} \times \frac{2}{5} \times \frac{1}{3}$$

$$(b) \frac{3}{8} \times \frac{1}{5} \times \frac{5}{6}$$

$$(c) \frac{7}{9} \times \frac{1}{2} \div \frac{2}{11}$$

$$(d) \frac{43}{50} \times \frac{1}{5} \div \frac{7}{20}$$

(a) A rectangle has an area of  $\frac{3}{8}$  cm<sup>2</sup>. If the width is  $\frac{1}{2}$  cm, calculate the length.

(b) A box is  $\frac{1}{6}$  cm long,  $\frac{2}{3}$  cm wide, and  $\frac{7}{9}$  cm high. Calculate the volume of the box.

# Fluency Practice

Convert into improper fractions:

- (a)  $2\frac{1}{2}$     (b)  $3\frac{4}{7}$     (c)  $5\frac{1}{6}$   
(d)  $4\frac{2}{13}$     (e)  $7\frac{7}{10}$     (f)  $2\frac{5}{9}$

Convert into mixed numbers:

- (a)  $\frac{8}{3}$     (b)  $\frac{25}{4}$     (c)  $\frac{31}{6}$   
(d)  $\frac{18}{7}$     (e)  $\frac{92}{9}$     (f)  $\frac{59}{11}$

Calculate, giving your answers in their simplest form:

- (a)  $1\frac{2}{3} \times 2\frac{1}{5}$     (b)  $2\frac{3}{5} \times 1\frac{5}{6}$   
(c)  $3\frac{1}{2} \times \frac{2}{5}$     (d)  $2\frac{1}{4} \times 3\frac{3}{10}$   
(e)  $\frac{1}{8} \div 1\frac{1}{2}$     (f)  $2\frac{1}{4} \div \frac{1}{2}$   
(g)  $3\frac{2}{5} \div 1\frac{3}{4}$     (h)  $2\frac{5}{6} \div 1\frac{2}{3}$

Calculate, giving your answers in their simplest form:

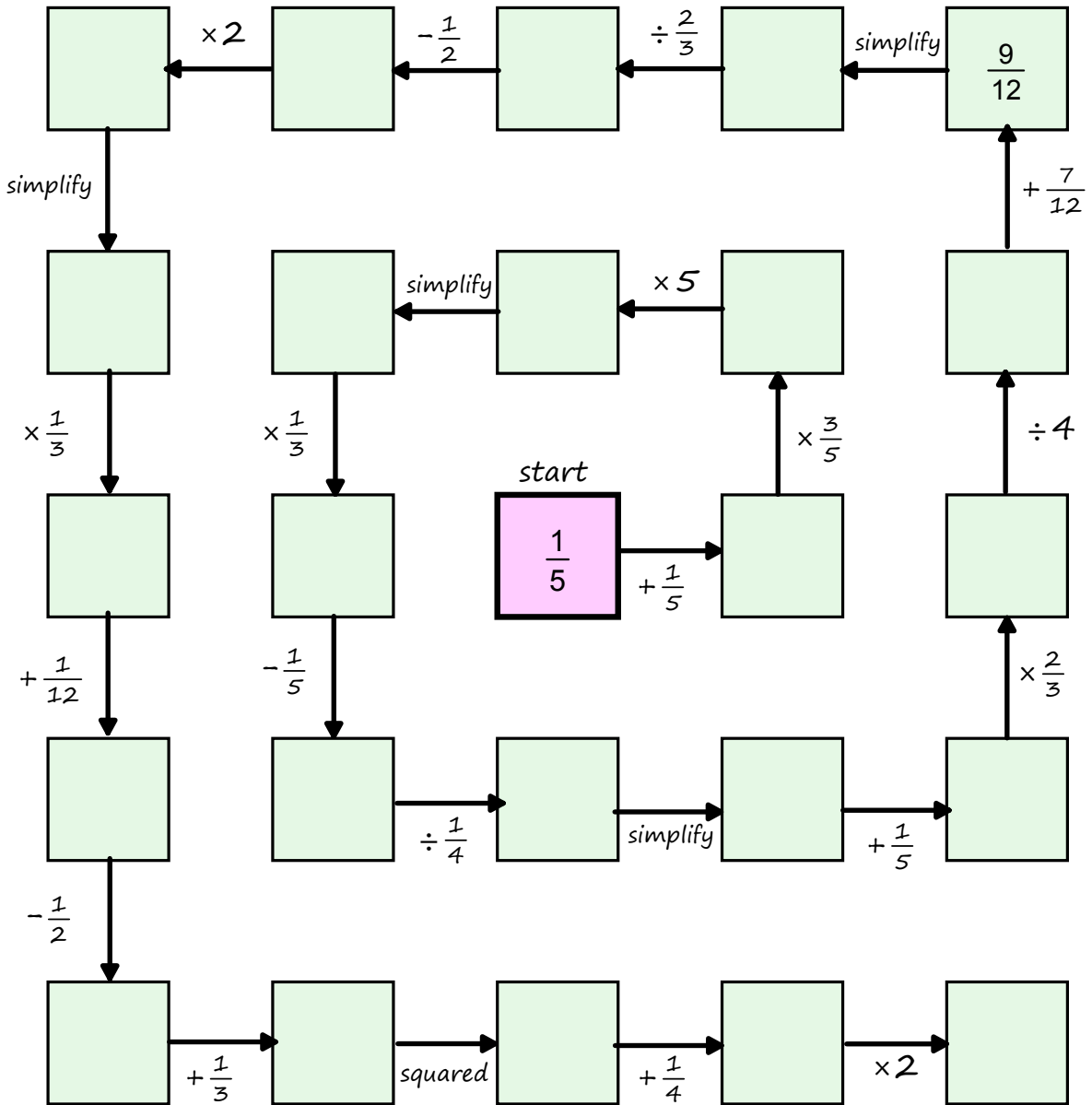
- (a)  $1\frac{3}{5} + \frac{2}{5}$     (b)  $2\frac{6}{7} + 2\frac{1}{7}$   
(c)  $5\frac{2}{3} - 2\frac{1}{6}$     (d)  $4\frac{1}{4} - \frac{5}{6}$   
(e)  $2\frac{3}{7} + 3\frac{1}{4}$     (f)  $5\frac{2}{3} - 1\frac{4}{7}$   
(g)  $2\frac{10}{11} + \frac{1}{2}$     (h)  $6\frac{2}{5} - 2\frac{5}{6}$   
(i)  $5\frac{1}{2} - 4\frac{1}{3}$     (j)  $4\frac{2}{3} + 2\frac{1}{5}$

A machine takes  $2\frac{3}{5}$  minutes to make a microchip. How long will it take to produce 20 microchips?

Calculate the area and perimeter of a rectangle of length  $4\frac{2}{5}$  cm and width  $2\frac{1}{4}$  cm.

# Operations with Fractions

Start in the middle and work your way around the spiral, finding your answers at the bottom and crossing them off as you go.



**jumbled answers**

- $\frac{6}{15}$   $\frac{3}{4}$   $\frac{1}{3}$   $\frac{1}{9}$   $\frac{6}{12}$   $\frac{2}{12}$   $1$   $\frac{13}{36}$   $\frac{2}{3}$   $\frac{12}{15}$
- $\frac{26}{36}$   $\frac{30}{25}$   $\frac{4}{5}$   $\frac{6}{5}$   $\frac{9}{8}$   $\frac{5}{8}$   $\frac{2}{5}$   $\frac{5}{12}$   $0$   $\frac{5}{4}$   $\frac{3}{15}$   $\frac{10}{8}$   $\frac{6}{25}$



## Fluency Practice

**1.**  $\frac{1}{2} \times \frac{1}{3} + \frac{1}{4}$

**3.**  $\frac{1}{4}$  of  $\frac{2}{5} + \frac{3}{5}$

**5.**  $\frac{2}{3} \div \frac{1}{3} - \frac{2}{5}$

**7.**  $1\frac{3}{4} - \frac{4}{5} \div \frac{1}{2}$

**9.**  $2\frac{3}{5} - 5\frac{1}{4} \times 1\frac{1}{7}$

**11.**  $1\frac{1}{2} + \frac{2}{3}$  of  $(\frac{3}{8} + \frac{3}{4})$

**13.**  $8\frac{1}{2} + 5\frac{1}{4} \times 3\frac{1}{7}$

**15.**  $\frac{1\frac{1}{2} \times 1\frac{1}{3} \times 2\frac{4}{5}}{6\frac{1}{8} - 3\frac{1}{2}}$

**17.**  $\frac{4\frac{1}{2} + 3\frac{5}{7}}{2\frac{1}{3} - 1\frac{19}{48}}$

**19.**  $\frac{\frac{3}{22} \text{ of } (5\frac{2}{5} - 3\frac{4}{9})}{(1\frac{5}{12} + 2\frac{3}{4}) \div 11\frac{23}{32}}$

**2.**  $\frac{1}{2} + \frac{1}{4} \times \frac{1}{3}$

**4.**  $\frac{1}{4}$  of  $(\frac{2}{5} + \frac{3}{5})$

**6.**  $\frac{2}{3} \div (\frac{1}{3} - \frac{2}{15})$

**8.**  $(1\frac{3}{4} - \frac{4}{5}) \div \frac{1}{2}$

**10.**  $5\frac{3}{20} - 2\frac{2}{3} \div 1\frac{7}{9}$

**12.**  $\frac{1\frac{1}{2} + 2\frac{1}{3}}{46}$

**14.**  $4\frac{1}{3} - 3\frac{4}{5} \div 2\frac{8}{15}$

**16.**  $1\frac{1}{2} + (\frac{2}{3} \text{ of } \frac{3}{8} + \frac{3}{4})$

**18.**  $\frac{\frac{5}{8} + \frac{2}{3} \text{ of } 1\frac{7}{8}}{3\frac{3}{10} \div 1\frac{1}{10}}$

**20.**  $\frac{\frac{1}{1\frac{1}{3}} + \frac{1}{1\frac{1}{4}}}{\frac{1}{2} \text{ of } 3\frac{1}{10}}$

# Fluency Practice

- (a) Becky eats  $\frac{1}{3}$  of an apple pie and Joe eats  $\frac{2}{5}$  of the same pie. What fraction of the apple pie has been eaten?
- (b) Boris spends  $\frac{2}{7}$  of his salary on rent and  $\frac{1}{6}$  on bills. What fraction of his salary has he spent on rent and bills?
- (c) A fuel tank is  $\frac{3}{4}$  full. Bill drives to York and uses  $\frac{1}{10}$  of a tank of fuel. What fraction of fuel remains in the tank?

- (a) In a class,  $\frac{3}{5}$  of students are girls. Of these girls,  $\frac{2}{3}$  wear glasses. What fraction of the class are girls who wear glasses?
- (b) Jorge has  $\frac{3}{4}$  kg of pastry. Each pie takes  $\frac{1}{12}$  kg of pastry. How many pies can Jorge make with the pastry he has?

- (a) Katy eats  $\frac{2}{7}$  of a pizza and then Yusuf eats  $\frac{1}{4}$  of the same pizza. What fraction of pizza is still uneaten?
- (b) Henrik spends  $\frac{2}{9}$  of his allowance on snacks and  $\frac{1}{5}$  of his allowance on books. What fraction of his allowance does he have left to spend?

- (a) In a theatre, 70% of people are adults. The rest are children. Of these children  $\frac{1}{3}$  are girls. What fraction of all the people at the theatre are boys?
- (b) At a gym all members choose either treadmill, weights or bike. 35% choose bike and  $\frac{3}{7}$  choose weights. What fraction of gym members have chosen treadmill?

# Fluency Practice

Question 1: Work out each of the following

- (a)  $\frac{1}{2}$  of 10      (b)  $\frac{1}{3}$  of 18      (c)  $\frac{1}{5}$  of 20      (d)  $\frac{1}{4}$  of 24  
(e)  $\frac{1}{9}$  of 27      (f)  $\frac{1}{10}$  of 160      (g)  $\frac{1}{8}$  of 80      (h)  $\frac{1}{7}$  of 49  
(i)  $\frac{1}{2}$  of 9      (j)  $\frac{1}{5}$  of 65      (k)  $\frac{1}{12}$  of 72      (l)  $\frac{1}{11}$  of 132

Question 2: Work out each of the following

- (a)  $\frac{2}{3}$  of 15      (b)  $\frac{7}{10}$  of 20      (c)  $\frac{2}{5}$  of 30      (d)  $\frac{3}{4}$  of 32  
(e)  $\frac{3}{5}$  of 45      (f)  $\frac{2}{7}$  of 28      (g)  $\frac{3}{8}$  of 88      (h)  $\frac{3}{10}$  of 120  
(i)  $\frac{5}{9}$  of 63      (j)  $\frac{13}{20}$  of 60      (k)  $\frac{2}{7}$  of 91      (l)  $\frac{4}{15}$  of 120

Question 3: Work out each of the following.  
Include suitable units.

- (a)  $\frac{1}{3}$  of £21      (b)  $\frac{3}{4}$  of 100kg      (c)  $\frac{2}{3}$  of 27cm      (d)  $\frac{7}{8}$  of 32 seconds  
(e)  $\frac{2}{5}$  of 90 miles      (f)  $\frac{5}{6}$  of £150      (g)  $\frac{5}{12}$  of 240ml      (h)  $\frac{9}{10}$  of 310 students  
(i)  $\frac{1}{8}$  of a day      (j)  $\frac{4}{5}$  of 1km      (k)  $\frac{3}{7}$  of 2 weeks      (l)  $\frac{1}{500}$  of 1m

Question 4: Work out each of the following.

- (a)  $\frac{3}{10}$  of 32 miles      (b)  $\frac{2}{5}$  of 9kg      (c)  $\frac{1}{3}$  of 8 litres      (d)  $\frac{3}{5}$  of £7  
(e)  $\frac{1}{8}$  of 50cm      (f)  $\frac{1}{5}$  of 4931km      (g)  $\frac{3}{4}$  of £57      (h)  $\frac{2}{9}$  of 211km

Question 5: Work out the largest of each of the following pairs.

- (a)  $\frac{1}{3}$  of 21 *or*  $\frac{1}{2}$  of 12      (b)  $\frac{1}{6}$  of 30 *or*  $\frac{2}{3}$  of 9      (c)  $\frac{2}{5}$  of 65 *or*  $\frac{3}{4}$  of 32  
(d)  $\frac{1}{5}$  of 2m *or*  $\frac{3}{4}$  of 60cm      (e)  $\frac{3}{8}$  of a day *or*  $\frac{1}{10}$  of 85 hours  
(f)  $\frac{7}{15}$  of 480 *or*  $\frac{2}{3}$  of 453      (g)  $\frac{3}{10}$  of 395 *or*  $\frac{2}{7}$  of 420

# Intelligent Practice

Calculate:

1)  $\frac{1}{5}$  of 60

2)  $\frac{1}{5}$  of 30

3)  $\frac{2}{5}$  of 30

4)  $\frac{20}{5}$  of 30

5)  $\frac{20}{50}$  of 30

6)  $\frac{20}{50}$  of 300

7)  $\frac{2}{5}$  of 300

8)  $\frac{2}{5}$  of 3

9)  $\frac{3}{5}$  of 2

10)  $\frac{3}{2}$  of 5

11)  $\frac{2}{3}$  of 5

12)  $\frac{2}{3}$  of  $\frac{1}{2}$

# Extension

Question 1: James has 20 sweets.

$\frac{3}{4}$  of the sweets are red.

How many sweets are red?



Question 2: In a class, there are 24 students.

$\frac{1}{8}$  of the students wear glasses.

How many students wear glasses?

Question 3: There are 40 apples in a crate.

$\frac{3}{5}$  of the apples are bad.

How many good apples are there?



Question 4: On Wednesday, James slept for  $\frac{3}{8}$  of the day

(a) How many hours did James spend sleeping?

(b) For how many hours was James awake?

(c) What fraction of the day was James awake?



Question 5: Declan won £6000 in a competition.

He invests  $\frac{2}{5}$  of the money.

How much money did Declan invest?

Question 6: Katie has £1200.

She gives  $\frac{1}{3}$  of the money to her sister.

Then Katie gives  $\frac{1}{4}$  of the remaining money to her brother.

How much money does Katie have left?

Question 7: The attendance at a Sheffield United match is 15,291

$\frac{2}{9}$  of the crowd are children.

How many adults attended the match?



# Extension

Question 8: There are 194 students in a primary school.

Mr Wallace says that exactly  $\frac{1}{4}$  of the students are left handed.

Explain why Mr Wallace must be wrong.

Question 9: Connor has saved £450.

He spends  $\frac{1}{5}$  of the £450 on a new tyre for his car.

Connor spends  $\frac{2}{3}$  of the £450 on a new guitar.

What fraction of the £450 does Connor have left?

Question 10: The size of a jar of coffee is increased by one-fifth.

The new size is later reduced by one-fifth.

Is the new jar smaller, the same size or larger than the original?

Explain how you worked out your answer.

Question 11: A company earns £3,178,784 in 2016.

$\frac{4}{7}$  of the income is spent on salaries.

How much money does the company spend on salaries in 2016?

# Fluency Practice

Question 1:

(a) Increase 40 by  $\frac{1}{2}$

(b) Increase 18 by  $\frac{1}{3}$

(c) Decrease 20 by  $\frac{1}{4}$

(d) Increase 30 by  $\frac{1}{5}$

(e) Decrease 24 by  $\frac{1}{8}$

(f) Decrease 70 by  $\frac{1}{10}$

(g) Increase 120 by  $\frac{1}{3}$

(h) Decrease 80 by  $\frac{1}{5}$

(i) Increase 72 by  $\frac{1}{9}$

Question 2:

(a) Increase 12 by  $\frac{2}{3}$

(b) Decrease 40 by  $\frac{3}{10}$

(c) Increase 30 by  $\frac{2}{5}$

(d) Decrease 16 by  $\frac{3}{4}$

(e) Increase 90 by  $\frac{7}{10}$

(f) Decrease 14 by  $\frac{3}{7}$

(g) Increase 48 by  $\frac{5}{8}$

(h) Decrease 54 by  $\frac{2}{9}$

(i) Increase 84 by  $\frac{3}{4}$

(j) Increase 275 by  $\frac{2}{5}$

(k) Decrease 240 by  $\frac{3}{8}$

(l) Increase 324 by  $\frac{7}{9}$

Question 3:

(a) Increase 60cm by  $\frac{3}{10}$

(b) Decrease 120kg by  $\frac{1}{4}$

(c) Increase 400ml by  $\frac{2}{5}$

(d) Increase 14g by  $\frac{1}{5}$

(e) Decrease 50 litres by  $\frac{1}{8}$

(f) Increase 130ml by  $\frac{3}{4}$

(g) Increase £76 by  $\frac{2}{5}$

(h) Increase 92cm by  $\frac{3}{20}$

(i) Increase 1.4kg by  $\frac{7}{8}$

# Intelligent Practice

1) Increase 24 by  $\frac{1}{3}$

2) Increase 24 by  $\frac{2}{3}$

3) Increase 12 by  $\frac{1}{3}$

4) Increase 12 by  $\frac{2}{3}$

5) Increase 12 by  $\frac{20}{3}$

6) Increase 120 by  $\frac{20}{30}$

7) Increase 64 by  $\frac{1}{8}$

8) Increase 64 by  $\frac{3}{8}$

9) Increase 64 by  $\frac{30}{8}$

10) Increase 6.4 by  $\frac{3}{8}$

11) Increase £800 by  $\frac{1}{4}$

12) Increase £800 by  $\frac{5}{4}$

1) Decrease 28 by  $\frac{1}{7}$

2) Decrease 28 by  $\frac{5}{7}$

3) Decrease 14 by  $\frac{1}{7}$

4) Decrease 14 by  $\frac{2}{7}$

5) Decrease 14 by  $2\frac{6}{7}$

6) Decrease 140 by  $\frac{20}{70}$

7) Decrease 36 by  $\frac{1}{4}$

8) Decrease 36 by  $\frac{3}{4}$

9) Decrease 16 by  $\frac{1}{4}$

10) Decrease 16 by  $\frac{3}{4}$

11) Decrease 150kg by  $\frac{1}{5}$

12) Decrease 1.50kg by  $\frac{1}{5}$



# Extension

Question 1: Annie is paid £300 per week.  
She is going to get a pay rise and her pay will increase by a  $\frac{1}{5}$ .  
What will her weekly pay be after the pay rise?

Question 2: Last season, the number of points a rugby team scored was 420.  
This season, the number of points they scored increased by  $\frac{2}{3}$ .  
How many points did the team score this season?

Question 3: A jam jar usually contains 420g of jam.  
A special edition jar contains  $\frac{3}{10}$  more jam.  
How much extra jam is in the special edition jar?

Question 4: Find the missing values

(a) 60 reduced by a  $\frac{1}{3}$  is the same as 50 reduced by a ?

(b) 72 increased by a  $\frac{3}{4}$  is the same as ? reduced by a  $\frac{1}{10}$

Question 5: In 1990, the number of birds that live on an island was 1,200.  
By 2010, the number of birds that live on the island increased by  $\frac{9}{4}$ .  
How many birds live on the island in 2010?

Question 6: Tia is training for a marathon using a special training programme.  
Each month she runs  $\frac{2}{5}$  more miles than she did in the previous month.  
In January, Tia ran 15 miles.

(a) How many miles did Tia run in February?

(b) How many miles did Tia run in March?

David says that Tia will not follow the special training programme forever.

(c) Explain why David is right.

# Intelligent Practice

Find the value of  $x$ :

1)  $\frac{1}{2}$  of  $x$  is 6

10)  $\frac{5}{4}$  of  $x$  is 2

2)  $\frac{1}{3}$  of  $x$  is 6

11)  $\frac{5}{4}$  of  $x$  is 5

3)  $\frac{1}{4}$  of  $x$  is 6

12)  $\frac{x}{4}$  of 4 is 5

4)  $\frac{1}{4}$  of  $x$  is 3

13)  $\frac{x}{4}$  of 4 is 20

5)  $\frac{3}{4}$  of  $x$  is 3

14)  $\frac{x}{4}$  of 8 is 20

6)  $\frac{3}{4}$  of  $x$  is 30

15)  $\frac{x}{6}$  of 8 is 20

7)  $\frac{5}{4}$  of  $x$  is 30

8)  $\frac{5}{4}$  of  $x$  is 20

9)  $\frac{5}{4}$  of  $x$  is 200

# Fluency Practice

**Question 1:** Find the original number for each question below.

- (a)  $\frac{1}{2}$  of a number is 7, what is the number? (b)  $\frac{1}{3}$  of a number is 4, what is the number?  
(c)  $\frac{1}{4}$  of a number is 8, what is the number? (d)  $\frac{1}{5}$  of a number is 9, what is the number?  
(e)  $\frac{1}{2}$  of a number is 12.5, what is the number? (f)  $\frac{1}{3}$  of a number is 27, what is the number?  
(g)  $\frac{1}{10}$  of a number is 2.6, what is the number? (h)  $\frac{1}{12}$  of a number is 8, what is the number?

**Question 2:** Find the original number for each question below.

- (a)  $\frac{2}{3}$  of a number is 12, what is the number? (b)  $\frac{2}{5}$  of a number is 10, what is the number?  
(c)  $\frac{2}{7}$  of a number is 6, what is the number? (d)  $\frac{3}{10}$  of a number is 60, what is the number?  
(e)  $\frac{4}{9}$  of a number is 12, what is the number? (f)  $\frac{2}{3}$  of a number is 3, what is the number?  
(g)  $\frac{3}{4}$  of a number is 27, what is the number? (h)  $\frac{5}{12}$  of a number is 35, what is the number?

**Question 3:** Find the original number for each question below.

- (a) A number is increased by  $\frac{1}{3}$  to 16. What was the number?  
(b) A number is increased by  $\frac{1}{5}$  to 36. What was the number?  
(c) A number is decreased by  $\frac{1}{4}$  to 21. What was the number?  
(d) A number is decreased by  $\frac{1}{10}$  to 162. What was the number?  
(e) A number is increased by  $\frac{2}{5}$  to 49. What was the number?  
(f) A number is increased by  $\frac{3}{8}$  to 22. What was the number?  
(g) A number is decreased by  $\frac{4}{5}$  to 12. What was the number?  
(h) A number is decreased by  $\frac{13}{20}$  to 1400. What was the number?

# Extension

Question 1: Rebecca is  $\frac{1}{3}$  of Barry's age.

Barry is  $\frac{1}{6}$  of Neville's age.

If Rebecca is 4 years old, how old is Neville?



Question 2: A new snack bar contains 7.5g of sugar.

$\frac{3}{10}$  of the snack bar is sugar.

Work out the mass of the snack bar.

Question 3: In a class,  $\frac{2}{7}$  of the students have blonde hair.

There are 20 students without blonde hair.

How many students are in the class?

Question 4: The height of a tree increased by  $\frac{4}{15}$  during 2016.

The tree is 2.47m by the end of 2016.

Work out the height of the tree at the beginning of 2016.



Question 5: Laura invested some money.

In the first year, the amount of money increased by  $\frac{1}{20}$

In the second year, the amount of money increased by  $\frac{1}{5}$

In the third year, the amount of money decreased by  $\frac{1}{4}$

Was the investment a success?

# Fluency Practice

Work out

- (a)  $\frac{1}{4}$  of 28      (b)  $\frac{1}{3}$  of 27  
(c)  $\frac{1}{6}$  of 42      (d)  $\frac{1}{8}$  of 40  
(e)  $\frac{1}{10}$  of 35      (f)  $\frac{1}{5}$  of 22

Work out

- (a)  $\frac{3}{4}$  of 16      (b)  $\frac{4}{5}$  of 30  
(c)  $\frac{5}{6}$  of 48      (d)  $\frac{2}{3}$  of 39  
(e)  $\frac{5}{7}$  of 42      (f)  $\frac{3}{10}$  of 25  
(g)  $\frac{4}{11}$  of 55      (h)  $\frac{2}{5}$  of 12

Fill in the blanks.

- (a)  $\frac{\square}{5}$  of 25 = 10      (b)  $\frac{\square}{8}$  of 40 = 15  
(c)  $\frac{\square}{9}$  of 36 = 8      (d)  $\frac{5}{\square}$  of 24 = 20

Fill in the blanks. Give your fractions in their simplest form.

- (a)  $\frac{\square}{\square}$  of 20 = 8      (b)  $\frac{\square}{\square}$  of 30 = 6  
(c)  $\frac{\square}{\square}$  of 50 = 24      (d)  $\frac{\square}{\square}$  of 12 = 9

Fill in the blanks. Suggest two possible answers for each statement.

- (a)  $\frac{5}{6}$  of  $\square = \square$   
(b)  $\frac{2}{7}$  of  $\square = \square$

# Fluency Practice

Match the cards to the statements. Use each card once only. All fractions are proper and in the simplest form.

**A**

$\frac{\square}{6}$ of 12 = $\square$	$\frac{\square}{5}$ of 15 = $\square$
$\frac{\square}{6}$ of 30 = $\square$	$\frac{\square}{7}$ of 49 = $\square$

- 1 2 3 5 5 9 10 14

**B**

$\frac{\square}{8}$ of 24 = $\square$	$\frac{5}{6}$ of $\square$ = $\square$
$\frac{\square}{5}$ of 55 = $\square$	$\frac{3}{\square}$ of 40 = $\square$

- 3 4 7 20 21 24 30 33

**C**

$\frac{\square}{3}$ of 18 = $\square$	$\frac{\square}{5}$ of 20 = $\square$	$\frac{\square}{6}$ of 42 = $\square$
$\frac{\square}{9}$ of 99 = $\square$	$\frac{\square}{8}$ of 40 = $\square$	$\frac{\square}{4}$ of 48 = $\square$

- 2 2  
3 4  
5 5  
12 16  
22 25  
35 36

**D**

$\frac{3}{4}$ of $\square$ = $\square$	$\frac{\square}{8}$ of 56 = $\square$	$\frac{3}{\square}$ of $\square$ = 27
$\frac{4}{9}$ of $\square$ = $\square$	$\frac{\square}{11}$ of 55 = $\square$	$\frac{4}{\square}$ of $\square$ = 32

- 5 5  
8 9  
35 40  
44 45  
45 60  
72 99

# Intelligent Practice

Calculate:

1)  $\frac{3}{4} + \frac{1}{3}$

2)  $\frac{3}{4} \times \frac{1}{3}$

3)  $\frac{3}{4} \div \frac{1}{3}$

4)  $\frac{1}{3} \div \frac{3}{4}$

5)  $\frac{1}{3} - \frac{3}{4}$

6)  $1\frac{1}{3} - \frac{3}{4}$

7)  $1\frac{1}{3} - \frac{3}{4} \times \frac{2}{5}$

8)  $\frac{3}{4}$  of  $\frac{2}{5}$

9)  $\frac{3}{4}$  more than  $\frac{2}{5}$

10) Increase  $\frac{3}{4}$  by  $\frac{2}{5}$

11) Decrease  $\frac{3}{4}$  by  $\frac{2}{5}$

12)  $\left(\frac{3}{4}\right)^2$

13)  $\left(3\frac{3}{4}\right)^2$

14)  $\frac{\frac{3}{3}}{\frac{1}{4}}$

# Fluency Practice

<b>(a)</b>	Write 32 out of 80 as a fraction in its simplest form.		
<b>(b)</b>	Find $\frac{3}{7}$ of 63 cm	<b>(c)</b>	Work out $\frac{5}{11}$ of 26.4 kg
<b>(d)</b>	Write $\frac{26}{3}$ as a mixed number.	<b>(e)</b>	Write these fractions in order, smallest first. $\frac{7}{12}, \frac{3}{4}, \frac{15}{24}, \frac{2}{3}$
<b>(f)</b>	$\frac{5}{6}$ of a number is 65. Find the number.	<b>(g)</b>	There are 45 children and 75 adults at a cinema. Write the fraction of children at the cinema in its simplest form.
<b>(h)</b>	Work out $2\frac{4}{7} + \frac{3}{4}$	<b>(i)</b>	Work out $\frac{5}{12} \times 4$ , giving your answer as a mixed number in its simplest form.
<b>(j)</b>	Work out $4\frac{7}{12} - 2\frac{1}{4}$ giving your answer as a mixed number in its simplest form.	<b>(k)</b>	Work out $4\frac{1}{5} \div 1\frac{3}{7}$ , giving your answer as a mixed number.
<b>(l)</b>	Work out $7\frac{4}{5} + 2\frac{6}{7}$	<b>(m)</b>	Show that $2\frac{5}{8} \div 1\frac{1}{6} = 2\frac{1}{4}$
<b>(n)</b>	Show that $5\frac{1}{2} - 3\frac{5}{6} \div 1\frac{2}{3} = 3\frac{1}{5}$		



# Fluency Practice

Match these calculations to the jumbled answers on the right.

$\frac{3}{6} \times \frac{1}{4}$	$5 \times ? = 1$	$-\frac{2}{5} \times ? = 1$	$\frac{2}{3} \times 3$
$5 \times \frac{1}{4} \times 2$	$? \times \frac{2}{7} = 1$	$-4 \times \frac{2}{3}$	$-\frac{1}{8} \times -2$
What is the reciprocal of: $1\frac{1}{5}$	$\frac{1}{5} \times ? = \frac{3}{5}$	$-\left(\frac{2}{3}\right)^2$	$\frac{3}{5} \times ? = 1$
$\frac{3}{8} \times ? = \frac{12}{32}$	$1\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{3}$ of 18	$12 \times ? = \frac{12}{5}$
$\left(\frac{4}{3}\right)^2$	$4 \times \frac{1}{4}$	$\left(-\frac{1}{5}\right)^2$	$-\frac{3}{8} \times ? = \frac{6}{8}$
$2\frac{1}{3} \times 1\frac{1}{5}$	$-\frac{2}{3} \times -\frac{1}{6} \times \frac{3}{4}$	$-\frac{1}{4} \times \frac{-2}{3}$	$\frac{2}{3}$ of $\frac{1}{4}$
$\frac{2}{5}$ of 25	What is the reciprocal of: 3	$6 \times 1\frac{1}{5}$	What is the reciprocal of: $2\frac{1}{4}$

- $6$

$\frac{16}{9}$

$7\frac{1}{2}$

$\frac{36}{5}$

$2$

$3$

$\frac{3}{4}$

$1\frac{1}{4}$

$1$

$\frac{5}{2}$

$1$

$5$

$\frac{4}{-9}$

$\frac{14}{5}$

$5$

$\frac{1}{12}$

$\frac{4}{9}$

$8$

$-\frac{1}{3}$

$\frac{1}{25}$

$10$

$-\frac{2}{3}$

$-\frac{5}{2}$

$\frac{1}{6}$

$\frac{1}{5}$

$\frac{1}{3}$

$\frac{5}{3}$

$1\frac{1}{5}$

# Fluency Practice

A	B	C	D	E	F	G	H	I	J

The cards at the top need to be matched into equivalent pairs. Then match each pair to its answer at the bottom.  
Record your pairs in the table.

1.	$\frac{1}{5} \times \frac{1}{4}$	2.	$\frac{4}{5} \times \frac{1}{5}$	3.	$\frac{4}{5} \div \frac{1}{4}$	4.	$\frac{4}{5}$ of 5	5.	$\frac{1}{4} \times \frac{5}{4}$
6.	$\frac{1}{5} \times 4$	7.	$\frac{4}{5} \times 4$	8.	$\frac{1}{5} \div 4$	9.	$4 \div \frac{4}{5}$	10.	$\frac{4}{5} \div \frac{1}{5}$
11.	$\frac{1}{4} \div \frac{4}{5}$	12.	$\frac{1}{4} \times \frac{1}{4}$	13.	$\frac{4}{5} \div 5$	14.	$\frac{4}{5} \div 4$	15.	$\frac{4}{5} \times \frac{1}{4}$
16.	$\frac{1}{4}$ of $\frac{1}{4}$	17.	$\frac{1}{5} \div 5$	18.	$\frac{1}{5} \div \frac{1}{4}$	19.	$\frac{5}{4} \times 4$	20.	$\frac{1}{5}$ of $\frac{1}{5}$

A.	$\frac{1}{20}$	B.	$\frac{5}{16}$	C.	$\frac{1}{5}$	D.	$\frac{4}{5}$	E.	5
F.	$\frac{16}{5}$	G.	4	H.	$\frac{1}{16}$	I.	$\frac{4}{25}$	J.	$\frac{1}{25}$

# Fluency Practice

## Section One

Calculate each of the following

$$\textcircled{1} \quad \frac{3}{8} \times 1\frac{5}{7} \quad \textcircled{2} \quad 2\frac{1}{3} - 1\frac{2}{5} \quad \textcircled{3} \quad 4\frac{1}{2} \times 1\frac{2}{9} \quad \textcircled{4} \quad 2\frac{1}{3} + \frac{4}{5}$$

$$\textcircled{5} \quad 2\frac{3}{8} \div \frac{5}{16} \quad \textcircled{6} \quad \frac{5}{12} \times 2\frac{2}{9} \quad \textcircled{7} \quad 6\frac{1}{5} - 2\frac{1}{3} \quad \textcircled{8} \quad 2\frac{3}{8} \div \frac{5}{16}$$

$$\textcircled{9} \quad 3\frac{2}{5} - 1\frac{3}{4} \quad \textcircled{10} \quad 1\frac{1}{8} \div \frac{3}{4} \quad \textcircled{11} \quad 1\frac{3}{5} + 2\frac{4}{7} \quad \textcircled{12} \quad 1\frac{2}{3} \times 2$$

---

## Section Two

Calculate each of the following

$$\textcircled{1} \quad \frac{2}{3} \left( \frac{1}{5} + \frac{3}{4} \right) \quad \textcircled{2} \quad \frac{2}{7} \left( 1\frac{3}{4} + \frac{3}{8} \right) \quad \textcircled{3} \quad \frac{1}{7} \left( 2\frac{1}{4} + 3\frac{1}{5} \right) \quad \textcircled{4} \quad \frac{2}{3} \left( \frac{1}{6} + \frac{1}{2} \right)$$

$$\textcircled{5} \quad \frac{3}{8} \left( \frac{1}{3} - \frac{1}{5} \right) \quad \textcircled{6} \quad \frac{1}{2} \left( 2\frac{3}{10} + \frac{3}{4} \right) \quad \textcircled{7} \quad \frac{3}{8} \left( 3\frac{1}{6} - \frac{4}{5} \right) \quad \textcircled{8} \quad \left( \frac{1}{2} + \frac{1}{3} \right) \left( \frac{1}{2} - \frac{1}{3} \right)$$

---

## Section Three

Calculate each of the following

$$\textcircled{1} \quad \frac{5}{6} \text{ of } \frac{2}{3} + 1\frac{1}{6} \quad \textcircled{2} \quad 1\frac{5}{9} \text{ of } 2\frac{1}{7} \times \frac{1}{5} \quad \textcircled{3} \quad \frac{3}{8} \times 1\frac{5}{7} \text{ of } 4\frac{2}{3}$$

$$\textcircled{4} \quad \frac{4}{5} + \frac{2}{5} \text{ of } 3\frac{1}{2} \quad \textcircled{5} \quad 2\frac{1}{3} + \frac{5}{6} \text{ of } 1\frac{2}{5} \quad \textcircled{6} \quad \frac{2}{7} \text{ of } \left( 1\frac{3}{4} + \frac{3}{8} \right)$$

# 2 Decimals

# Fluency Practice

Work out:

1)  $12.28 + 443.2$

2)  $15 + 487.3$

3)  $38.16 + 71.5$

4)  $448.6 + 44.34$

5)  $20.61 + 54.4$

6)  $8.28 + 18.84$

7)  $42.49 + 9.13$

8)  $34.64 + 22.59$

9)  $33.64 + 38.48$

10)  $387.1 + 495.7$

# Fluency Practice

Question 1: Work out the answers to the following additions

- (a)  $4.5 + 2.3$       (b)  $8.4 + 1.7$       (c)  $0.7 + 0.5$       (d)  $2.8 + 10.3$   
(e)  $13.4 + 28.9$       (f)  $206.2 + 72.8$       (g)  $6.4 + 15.9$       (h)  $0.5 + 0.8 + 0.1$   
(i)  $9.7 + 1.4 + 1.3$       (j)  $16.8 + 3.9 + 102.2 + 87.4$

Question 2: Work out these additions

- (a)  $0.14 + 0.53$       (b)  $0.35 + 0.65$       (c)  $2.47 + 3.34$       (d)  $4.93 + 2.25$   
(e)  $4.77 + 1.84$       (f)  $10.38 + 6.81$       (g)  $7.83 + 12.49$       (h)  $0.56 + 107.08$   
(i)  $9.85 + 2.63 + 0.89$       (j)  $0.08 + 0.12 + 0.87 + 1.93 + 2.06$

Question 3: Complete these additions

- (a)  $6.5 + 1.73$       (b)  $0.56 + 1.6$       (c)  $2.45 + 7.8$       (d)  $8.67 + 3.9$   
(e)  $9.2 + 4.87$       (f)  $1.08 + 2.6$       (g)  $20.6 + 15.84$       (h)  $41.8 + 5.35$   
(i)  $7.4 + 2.329$       (j)  $0.018 + 2.39$       (k)  $9.224 + 8.89$       (l)  $0.293 + 9.815$   
(i)  $4.52 + 0.3 + 0.79 + 1.4$       (j)  $0.94 + 4.8 + 12.09 + 5.63$

# Adding Decimals Code Breaker!

Calculate the answer to these sums.

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. $1.23 + 0.6$ gives .....  | j. $0.04 + 1.092$ gives ..... |
| b. $4.69 + 1.2$ gives .....  | k. $5.1 + 2$ gives .....      |
| c. $3.28 + 2.61$ gives ..... | l. $1.4 + 0.63$ gives .....   |
| d. $0.2 + 0.02$ gives .....  | m. $2.3 + 4.7$ gives .....    |
| e. $5.1 + 0.79$ gives .....  | n. $0.8 + 1.52$ gives .....   |
| f. $1.1 + 0.02$ gives .....  | o. $0.9 + 0.756$ gives .....  |
| g. $1.456 + 0.2$ gives ..... | p. $4.9 + 2.32$ gives .....   |
| h. $1.5 + 0.82$ gives .....  | q. $1.3 + 0.73$ gives .....   |
| i. $1.34 + 3.87$ gives ..... | r. $5.2 + 0.961$ gives .....  |

**L**

- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....

# Code Box

0.03 = Q	1.604=F	2.32=H	5.89=O
0.22 = K	1.64 =W	3.03=Y	6.161=D
0.4 = J	1.656=T	3.30=!	6.41 = ?
0.765=C	1.83=L	5.21=E	7.0=G
1.12 =N	2.03=I	5.3 =M	7.1 =R
1.132 =B	2.13=%	5.71=P	7.2=V
1.458 =A	2.22=U	5.80=Z	7.22=S

- s.  $4.3 + 0.91$  gives .....
- t.  $1.0 + 2.3$  gives .....

- .....
- .....

# Purposeful Practice

what happens?

what is a general rule for such sums?

why does the rule work?

$$3.7 + 7.3 =$$

$$6.4 + 4.6 =$$

$$9.1 + 1.9 =$$

$$5.5 + 5.5 =$$

what happens?

what is a general rule for such sums?

why does the rule work?

$$1.91 + 0.19 + 0.1 =$$

$$1.28 + 0.12 + 0.8 =$$

$$1.73 + 0.17 + 0.3 =$$

$$1.37 + 0.13 + 0.7 =$$

generalising

what happens?

what is a general rule for such sums?

why does the rule work?

$$0.36 + 1.03 + 0.61 =$$

$$0.45 + 1.04 + 0.51 =$$

$$0.18 + 1.01 + 0.81 =$$

$$0.63 + 1.06 + 0.31 =$$

what happens?

what is a general rule for such sums?

why does the rule work?

$$1.5 + 0.19 + 1.06 =$$

$$2.4 + 0.29 + 1.05 =$$

$$7.1 + 0.79 + 1.02 =$$

$$4.3 + 0.49 + 1.04 =$$



# Extension

Question 1: Richard buys a notebook that costs £6.78 and a pen that costs £4.19.  
Work out the total cost.

Question 2: Holly is saving money.  
In January, she saves £15.15  
In February, she saves £8.82  
In March, Holly saves £13.37  
Work out how much she has saved in total.



Question 3: David drives 4.8 miles to Bristol and a further 6.7 miles to Bath.  
Work out how far he drives in total.

Question 4: Mr Jenkins has three pieces of rope.  
The pieces of rope are 2.35m, 1.8m and 3.06m long.  
Work out the total length of the pieces of rope.



Question 5: Shown is a rectangle.  
Calculate the perimeter.



Question 6: Work out the missing number.

$$\square - 5.28 = 10.9$$

Question 7: Shown is a shape made from three identical squares and three identical rectangles.  
Calculate the perimeter of the shape.



Question 8: The first four terms of a number sequence are  
2.52, 2.71, 2.9, 3.09, ..., ..., ...  
Work out the next two terms.

Question 9: Grace is working out  $12.4 + 3.18$   
Can you spot any mistakes?

	1	2	4
+	3	1	8
	4	4	2

Question 10: Neil writes down four numbers with a sum of 50.  
All the numbers have two decimal places and no two numbers are the same.  
Write down four possible numbers Neil could have written down.

# Adding Decimals Maze

Find the route through the maze which gives you a total of exactly 3.0 at the finish.  
Do not move diagonally.

Start with: <b>0</b>	<b>+0.7</b>	<b>+3.9</b>	<b>+0.3</b>	<b>+0.15</b>
<b>+0.01</b>	<b>+2.3</b>	<b>+0.07</b>	<b>+0.65</b>	<b>+0.2</b>
<b>+0.5</b>	<b>+0.33</b>	<b>+0.21</b>	<b>+0.54</b>	<b>+0.8</b>
<b>+0.49</b>	<b>+0.30</b>	<b>+0.7</b>	<b>+0.5</b>	<b>+0.25</b>
<b>+3.10</b>	<b>+0.0010</b>	<b>+0.9</b>	<b>+2.6</b>	<b>+0.25</b>
<b>+1.65</b>	<b>+0.001</b>	<b>+0.35</b>	<b>+0.99</b>	Finish with: <b>3.0 Exactly</b>

## Problem Solving

# Problem Solving

## adding decimals

- (A) the decimal point has been missed out of these addition sums  
place some decimal points, so that the sums are correct  
(there is more than one way to do this but just give one way)
- (1)  $15 + 9 = 105$                       (5)  $53 + 70 = 60$   
(2)  $4 + 83 = 123$                       (6)  $345 + 235 = 3685$   
(3)  $54 + 56 = 614$                     (7)  $158 + 268 = 2838$   
(4)  $26 + 78 = 806$                     (8)  $142 + 152 = 1662$
- (B) quite a few of these have mistakes in them  
work out whether the answers are correct or not  
where there is a mistake, correct it and indicate or explain the error
- (1)  $5.6 + 0.3 = 5.9$                     (5)  $0.1 + 3.56 = 3.57$   
(2)  $3.4 + 5 = 3.9$                     (6)  $2.8 + 3.2 = 5$   
(3)  $6.9 + 0.3 = 6.12$                 (7)  $2.71 + 3 = 3.01$   
(4)  $3.7 + 2.3 = 6$                     (8)  $5.63 + 43.2 = 99.5$
- (C) find at least five possibilities to
- (1)  $0.E + 0.F = 1.1$                     (2)  $0.AB + 0.CD = 1.1$

# Problem Solving

use the digits 2, 4, 7 and 9 once only

$$\square\square + \square \cdot \square = \square$$

how do you arrange these digits to get a number nearest to:

- (a) 50
- (b) 100
- (c) 32
- (d) 80

nearest to?

why are there two answers to these?

## Problem Solving

use all the digits **1, 2, 3, 4, 5, 6**, in the sum:

$$\begin{array}{c} \square \\ \square \\ \square \end{array} \cdot \begin{array}{c} \square \\ \square \\ \square \end{array} + \begin{array}{c} \square \\ \square \\ \square \end{array} \cdot \begin{array}{c} \square \\ \square \\ \square \end{array} + \begin{array}{c} \square \\ \square \\ \square \end{array}$$

try to get these  
answers:

- a) 7.05
- b) 10.02
- c) 11.91
- d) 13.44
- e) 11.82

what is the highest possible result?

what is the lowest possible result?

find six pairs of results that are  
0.09 apart

# Fluency Practice

Work out:

1)  $47.71 - 47.65$

2)  $458.6 - 7.19$

3)  $188.8 - 11.66$

4)  $45.02 - 23.32$

5)  $15.02 - 7.94$

6)  $482.8 - 18.03$

7)  $18.08 - 9.72$

8)  $366.5 - 228.1$

9)  $215 - 38.46$

10)  $405.1 - 75.8$

# Fluency Practice

Question 1: Work out the answers to the following subtractions

(a)  $0.9 - 0.1$       (b)  $0.8 - 0.3$       (c)  $0.7 - 0.6$       (d)  $0.5 - 0.2$

(e)  $1.2 - 0.3$       (f)  $1.5 - 0.4$       (g)  $1.8 - 0.6$       (h)  $1.9 - 1.2$

(i)  $2.4 - 0.5$       (j)  $3.8 - 2.5$       (k)  $4.1 - 1.8$       (l)  $5.5 - 3.1$

(m)  $8.7 - 1.3$       (n)  $9.2 - 5.8$       (o)  $7.3 - 3.9$       (p)  $8.5 - 0.9$

Question 2: Work out the answers to the following subtractions

(a)  $7.7 - 1.5$       (b)  $8.5 - 4.1$       (c)  $19.7 - 18.6$       (d)  $26.2 - 5.2$

(e)  $54.5 - 23.1$       (f)  $80.4 - 10.3$       (g)  $16.6 - 9.2$       (h)  $85.7 - 50.4$

(i)  $7.3 - 4$       (j)  $8.6 - 2$       (k)  $24.9 - 6$       (l)  $15.1 - 9$

(m)  $7 - 1.3$       (n)  $9 - 3.6$       (o)  $20 - 4.4$       (p)  $32 - 8.7$

Question 3: Work out these subtractions

(a)  $0.39 - 0.23$       (b)  $0.47 - 0.15$       (c)  $0.75 - 0.41$       (d)  $0.99 - 0.65$

(e)  $0.46 - 0.18$       (f)  $0.81 - 0.55$       (g)  $1.24 - 0.72$       (h)  $2.13 - 1.66$

(i)  $8.63 - 0.4$       (j)  $5.55 - 3.1$       (k)  $8.13 - 0.5$       (l)  $3.84 - 1.9$

(m)  $10.4 - 0.15$       (n)  $5.8 - 1.92$       (o)  $14.5 - 0.77$       (p)  $12 - 4.55$

Question 4: Complete these subtractions

(a)  $40.5 - 19.3$       (b)  $88.3 - 52.58$       (c)  $155.73 - 48.89$       (d)  $203.5 - 51.64$

(e)  $498 - 70.94$       (f)  $500 - 384.11$       (g)  $8200 - 901.3$       (h)  $10000 - 4901.33$

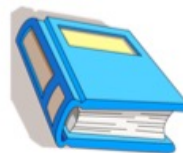
Question 5: Work out each of the following

(a)  $1.284 - 0.151$       (b)  $2.028 - 1.115$       (c)  $39.45 - 6.061$

(d)  $40.5 - 7.258$       (e)  $204.1945 - 203.7885$       (f)  $716 - 409.4822$

# Extension

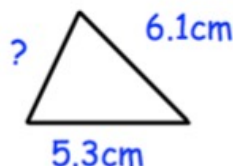
Question 1: Paul buys a book that costs £6.89 and pays with a £10 note.  
How much change should Paul get?



Question 2: Jennifer has 1.2kg of flour.  
She uses 0.75kg of the flour to bake a cake.  
How much flour does she have left?



Question 3: The perimeter of the triangle is 16.1cm.  
Work out the length of the missing side.



Question 4: The first four terms of a number sequence are

15.8, 15.1, 14.4, 13.7, \_\_, \_\_

Work out the next two terms.

Question 5: Find the missing numbers

$$8.41 + \square = 25$$

$$17.27 - \square = 1.89$$

Question 6: Maxine buys 3 magazines that cost £1.99, £2.45 and £3.70.  
She pays with a £50 note.  
Work out how much change she should receive?

Question 7: Angus is working out  $7.23 - 1.91$   
Can you spot any mistakes?

	7	•	2	3	
-	1	•	9	1	
<hr/>					
	6		7	2	

$$7.23 - 1.91 = 672$$



# Fluency Practice

Here are some facts. Can you use them to help solve the multiplications?

$$68 \times 63 = 4,284$$

$$49 \times 71 = 3,479$$

$$48 \times 39 = 1,872$$

$$33 \times 96 = 3,168$$

$$56 \times 98 = 5,488$$



a)  $6.8 \times 6.3$

e)  $0.49 \times 0.71$

i)  $0.38 \times 0.48$

m)  $0.96 \times 0.033$

b)  $68 \times 0.63$

f)  $0.56 \times 0.98$

j)  $0.068 \times 0.63$

n)  $33 \times 0.00096$

c)  $4.9 \times 7.1$

g)  $49 \times 7.1$

k)  $3.3 \times 9.6$

o)  $5.6 \times 0.00098$

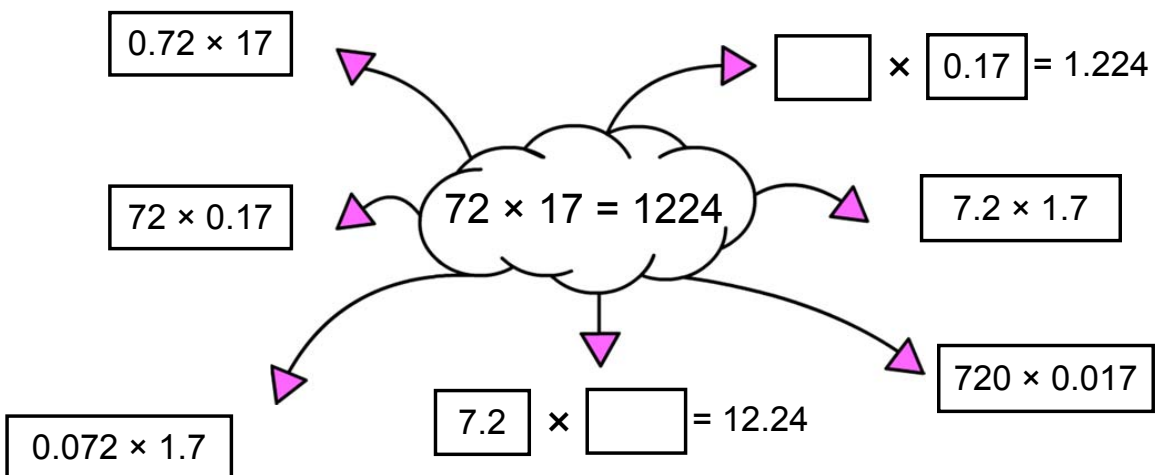
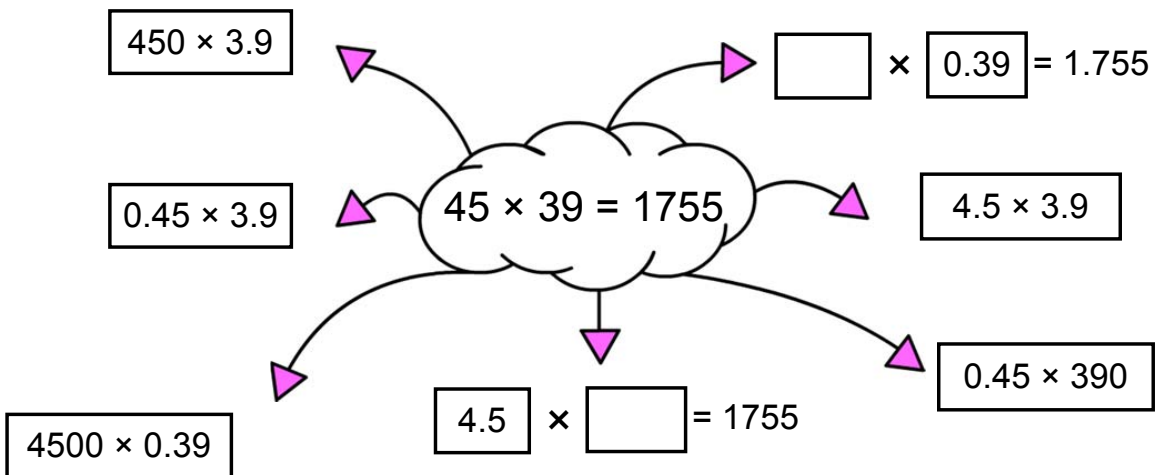
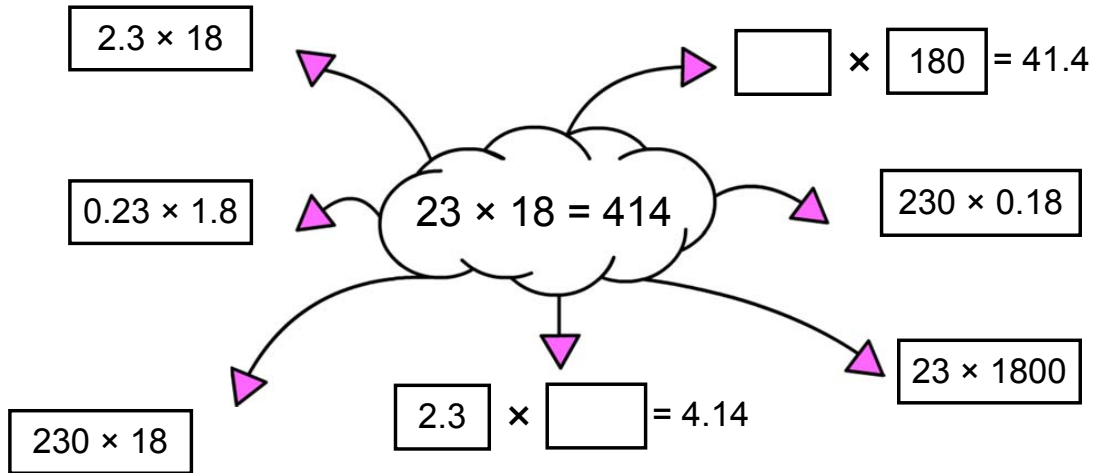
d)  $0.48 \times 3.9$

h)  $4.8 \times 3.9$

l)  $0.33 \times 0.096$

p)  $0.0049 \times 0.071$

# Fluency Practice



# Fluency Practice

## related calculations

Can you use one calculation to work out the answer to another?

$$12 \times 400 =$$

$$12 \times 40 =$$

$$12 \times 4 = 48$$

$$12 \times 0.4 =$$

$$12 \times 0.04 =$$

$$12 \times \dots = 0.048$$

$$19 \times 900 =$$

$$19 \times 90 = 1710$$

$$19 \times 9 =$$

$$19 \times 0.9 =$$

$$19 \times 0.09 =$$

$$19 \times \dots = 0.171$$

$$23 \times 9 =$$

$$23 \times 0.9 = 20.7$$

$$23 \times 0.09 =$$

$$23 \times 0.009 =$$

$$23 \times 0.0009 =$$

$$23 \times \dots = 0.00207$$

carefull! both numbers are changing here:

$$1.7 \times 19 =$$

$$17 \times 1.9 = 32.3$$

$$0.17 \times 0.19 =$$

$$17 \times 190 =$$

$$1.7 \times 0.19 =$$

$$1.7 \times \dots = 3230$$

$$9 \times 1.2 =$$

$$0.9 \times 12 = 10.8$$

$$0.09 \times 120 =$$

$$0.009 \times 1200 =$$

$$0.0009 \times 12000 =$$

$$\dots \times \dots =$$

$$23 \times 9 =$$

$$2.3 \times 0.9 = 2.07$$

$$23 \times 0.09 =$$

$$0.23 \times 0.09 =$$

$$2.3 \times 900 =$$

$$2.3 \times \dots = 0.0207$$

## \*challenge\*

1.  $6 \times 7 =$

2.  $0.6 \times 7 =$

3.  $3 \times 4 =$

4.  $0.3 \times 0.4 =$

5.  $8 \times 9 =$

6.  $80 \times 0.09 =$

7.  $4 \times 4 =$

8.  $400 \times 400 =$

9.  $7 \times 3 =$

10.  $0.7 \times 0.003 =$

## \*more\*

A.  $0.9 \times 0.3 =$

B.  $80 \times 0.06 =$

C.  $300 \times 0.4 =$

D.  $25 \times 0.06 =$

E.  $34 \times 0.08 =$

# Fluency Practice

1. Find the missing value, given each calculation

- a.  $4 \times 6 = 24$   
 i.  $4 \times \square = 240$   
 ii.  $\square \times 6 = 2400$   
 iii.  $40 \times 60 = \square$   
 iv.  $0.4 \times \square = 2.4$
- b.  $8 \times 7 = 56$   
 i.  $\square \times 7 = 5600$   
 ii.  $8 \times \square = 560$   
 iii.  $8 \times \square = 5.6$   
 iv.  $80 \times 0.7 = \square$
- c.  $3 \times 9 = 27$   
 i.  $3 \times \square = 270$   
 ii.  $\square \times 900 = 27000$   
 iii.  $0.3 \times 9 = \square$   
 iv.  $0.3 \times 0.9 = \square$
- d.  $5 \times 11 = 55$   
 i.  $\square \times 11 = 5500$   
 ii.  $50 \times \square = 5500$   
 iii.  $\square \times 1.1 = 5.5$   
 iv.  $500 \times 110 = \square$
- e.  $12 \times 9 = 108$   
 i.  $12 \times 90 = \square$   
 ii.  $\square \times 9 = 10.8$   
 iii.  $120 \times 0.9 = \square$   
 iv.  $1.2 \times \square = 1.08$
- f.  $15 \times 13 = 195$   
 i.  $150 \times \square = 195000$   
 ii.  $1.5 \times 1.3 = \square$   
 iii.  $\square \times 130 = 19.5$   
 iv.  $\square \times 1300 = 1.95$

2. Find the missing value, given each calculation

- a.  $17 \times 4 = 68$   
 i.  $17 \times 5 = \square$   
 ii.  $16 \times 4 = \square$   
 iii.  $17 \times \square = 51$   
 iv.  $\square \times 4 = 72$
- b.  $21 \times 8 = 168$   
 i.  $22 \times 8 = \square$   
 ii.  $21 \times 7 = \square$   
 iii.  $21 \times \square = 189$   
 iv.  $\square \times 8 = 160$
- c.  $64 \times 11 = 704$   
 i.  $63 \times 11 = \square$   
 ii.  $64 \times 12 = \square$   
 iii.  $\square \times 11 = 715$   
 iv.  $64 \times \square = 640$

3. Find the missing value, given each calculation

- a.  $6^2 = 36$   
 i.  $60^2 = \square$   
 ii.  $600^2 = \square$
- b.  $9^2 = 81$   
 i.  $90^2 = \square$   
 ii.  $0.9^2 = \square$
- c.  $12^2 = 144$   
 i.  $1200^2 = \square$   
 ii.  $1.2^2 = \square$
- d.  $2^3 = 8$   
 i.  $20^3 = \square$   
 ii.  $200^3 = \square$

# Fluency Practice

Work out:

1)  $15.94 \times 3$

2)  $63.5 \times 7$

3)  $367.9 \times 5$

4)  $67.31 \times 9$

5)  $815.8 \times 4$

6)  $5.202 \times 5$

7)  $5.174 \times 4$

8)  $106.7 \times 7$

9)  $52.22 \times 6$

10)  $43.61 \times 9$

# Fluency Practice

Question 1: Work out the answers to the following multiplications

- |                       |                     |                      |                      |
|-----------------------|---------------------|----------------------|----------------------|
| (a) $1.2 \times 4$    | (b) $3.2 \times 3$  | (c) $5.3 \times 2$   | (d) $7.3 \times 3$   |
| (e) $1.6 \times 4$    | (f) $2.9 \times 5$  | (g) $4.2 \times 6$   | (h) $9.5 \times 7$   |
| (i) $6.7 \times 8$    | (j) $3.8 \times 9$  | (k) $12.8 \times 3$  | (l) $24.3 \times 4$  |
| (m) $37.5 \times 6$   | (n) $52.8 \times 7$ | (o) $173.2 \times 3$ | (p) $215.8 \times 6$ |
| (q) $1243.7 \times 9$ | (r) $79.5 \times 8$ |                      |                      |

Question 2: Work out the answers to the following multiplications

- |                       |                        |                       |                       |
|-----------------------|------------------------|-----------------------|-----------------------|
| (a) $1.26 \times 2$   | (b) $2.63 \times 3$    | (c) $5.14 \times 3$   | (d) $6.28 \times 4$   |
| (e) $7.53 \times 5$   | (f) $0.38 \times 8$    | (g) $9.62 \times 6$   | (h) $12.38 \times 7$  |
| (i) $16.42 \times 9$  | (j) $109.34 \times 4$  | (k) $9.08 \times 3$   | (l) $12.04 \times 7$  |
| (m) $0.383 \times 3$  | (n) $1.442 \times 6$   | (o) $8.291 \times 3$  | (p) $9.623 \times 5$  |
| (q) $3.706 \times 8$  | (r) $4.953 \times 7$   | (s) $0.482 \times 8$  | (t) $0.085 \times 7$  |
| (u) $1.3842 \times 3$ | (v) $4.3342 \times 6$  | (w) $8.2039 \times 5$ | (x) $7.3112 \times 9$ |
| (y) $512.83 \times 6$ | (z) $293.421 \times 4$ |                       |                       |

Question 3: Work out the answers to the following multiplications

- |                       |                       |                       |                      |
|-----------------------|-----------------------|-----------------------|----------------------|
| (a) $1.24 \times 13$  | (b) $2.51 \times 17$  | (c) $12.5 \times 23$  | (d) $3.28 \times 21$ |
| (e) $6.35 \times 35$  | (f) $7.65 \times 37$  | (g) $58.2 \times 46$  | (h) $4.23 \times 52$ |
| (i) $0.28 \times 57$  | (j) $0.817 \times 63$ | (k) $38.43 \times 19$ | (l) $5.45 \times 87$ |
| (m) $12.32 \times 73$ | (n) $2.3 \times 123$  | (o) $4.7 \times 253$  | (p) $8.6 \times 351$ |
| (q) $2.03 \times 152$ | (r) $1.02 \times 607$ |                       |                      |

# Fluency Practice

Work out:

1)  $53.21 \times 36.2$

2)  $461.6 \times 1.6$

3)  $17.97 \times 42.3$

4)  $87.65 \times 40.7$

5)  $560.8 \times 3.64$

6)  $7.812 \times 1.26$

7)  $6.941 \times 85.2$

8)  $24.08 \times 47.6$

9)  $443.3 \times 6.49$

10)  $86.88 \times 4.01$

# Fluency Practice

Question 4: Work out the answers to the following multiplications

- (a)  $0.2 \times 0.3$     (b)  $0.7 \times 0.2$     (c)  $0.9 \times 0.4$     (d)  $0.8 \times 0.6$   
(e)  $0.7 \times 0.7$     (f)  $0.6 \times 0.5$     (g)  $0.8 \times 0.5$     (h)  $0.5 \times 0.4$   
(i)  $0.8 \times 0.1$     (j)  $0.07 \times 0.5$     (k)  $0.04 \times 0.2$     (l)  $0.8 \times 0.07$   
(m)  $0.06 \times 0.9$     (n)  $0.04 \times 0.06$     (o)  $0.08 \times 0.03$     (p)  $0.02 \times 0.03$   
(q)  $0.003 \times 0.6$     (r)  $0.9 \times 0.002$     (s)  $0.008 \times 0.6$     (t)  $0.005 \times 0.4$   
(u)  $0.007 \times 0.02$     (v)  $0.008 \times 0.09$     (w)  $0.04 \times 0.004$     (x)  $0.005 \times 0.003$   
(y)  $0.008 \times 0.05$     (z)  $0.009 \times 0.008$

Question 5: Work out the answers to the following multiplications

- (a)  $3.1 \times 0.5$     (b)  $6.3 \times 0.3$     (c)  $5.4 \times 0.7$     (d)  $9.2 \times 0.6$   
(e)  $4.8 \times 0.9$     (f)  $2.4 \times 3.2$     (g)  $9.1 \times 1.3$     (h)  $5.5 \times 7.7$   
(i)  $1.7 \times 4.3$     (j)  $9.4 \times 4.9$     (k)  $0.13 \times 0.7$     (l)  $0.48 \times 0.3$   
(m)  $0.54 \times 0.9$     (n)  $0.18 \times 0.17$     (o)  $8.3 \times 0.37$     (p)  $3.5 \times 0.74$   
(q)  $0.94 \times 0.02$     (r)  $0.38 \times 0.06$     (s)  $0.039 \times 0.7$     (t)  $0.084 \times 1.2$   
(u)  $8.1 \times 0.05$     (v)  $9.4 \times 0.082$     (w)  $0.0048 \times 0.12$

Question 6: Work out the answers to the following multiplications

- (a)  $1.29 \times 1.4$     (b)  $3.52 \times 2.4$     (c)  $4.92 \times 0.34$     (d)  $8.12 \times 0.29$   
(e)  $6.3 \times 2.46$     (f)  $9.2 \times 7.15$     (g)  $0.843 \times 1.9$     (h)  $0.548 \times 2.7$   
(i)  $6.18 \times 5.1$     (j)  $18.2 \times 6.4$     (k)  $5.03 \times 2.8$     (l)  $40.8 \times 5.3$



## Fluency Practice

long multiplication of decimals

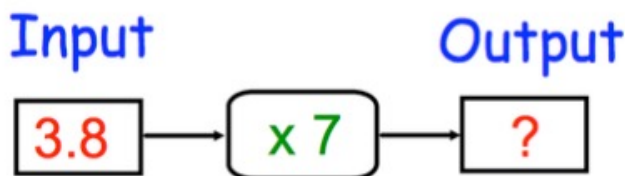
- (1)  $22.6 \times 0.3$                       (6)  $10.52 \times 7.5$
- (2)  $8.23 \times 1.2$                         (7)  $14.66 \times 1.6$
- (3)  $2.1 \times 2.7$                          (8)  $38.58 \times 3.2$
- (4)  $2.16 \times 1.6$                         (9)  $190.325 \times 2.4$
- (5)  $35.06 \times 2.5$                       (10)  $68.5871 \times 1.8$

please show your steps

## Extension

Question 1: Regan is paid £6.70 per hour. He works 8 hours in a week. Work out how much Regan should be paid.

Question 2: Calculate the output



Question 3: Calculate the area of the rectangle



Question 4: A bottle of cola costs £1.29  
Calculate the total cost of 6 bottles of cola.



Question 5: Mr and Mrs Jones bring their 5 children to a museum.

Adults	£17.60 each
Children	£7.55 each

Work out the total cost for the family.

# Extension

Question 6: Class 8A are going on a trip to a windmill.



The trip costs £3.70 each and there are 26 students in 8A.  
How much money should be collected?

Question 7: Mr. Jenkins is building a fence for his garden.  
The fence costs £12.60 per metre to build.  
The fence is 5.3 metres long.



Work out the total cost of building the fence.

Question 8: Calculate the area of this rectangle.



Question 9: Here are the prices of some fruit in a shop.



£0.97 per kilogram



£1.07 per kilogram



£1.46 per kilogram

Find the total cost of 1.2kg of apples, 3.5kg of oranges and 1.9kg of bananas.

# Fluency Practice

Calculate:

- (a)  $18 \times 9$       (b)  $43 \times 8$   
(c)  $37 \times 12$     (d)  $52 \times 13$   
(e)  $28 \times 19$     (f)  $62 \times 17$   
(g)  $253 \times 7$     (h)  $417 \times 9$

Calculate:

- (a)  $18 \times 0.9$     (b)  $43 \times 0.8$   
(c)  $37 \times 1.2$     (d)  $52 \times 1.3$   
(e)  $78 \times 1.6$     (f)  $21 \times 3.1$   
(g)  $383 \times 0.7$    (h)  $732 \times 0.9$

Calculate:

- (a)  $1.8 \times 0.9$     (b)  $4.3 \times 0.8$   
(c)  $3.9 \times 1.1$     (d)  $6.7 \times 1.3$   
(e)  $1.11 \times 2.5$    (f)  $2.1 \times 9.53$   
(g)  $0.26 \times 0.7$    (h)  $7.52 \times 0.9$

- (a) A hotdog costs £1.29. Find the cost of 8 hotdogs.  
(b) A carpet is £18.49 per square metre. Find the cost of 13 square metres.  
(c) John gets paid £8.56 per hour. He works 25 hours in a week. How much is his weekly pay?

- (a) Aisha buys 2.4 kg of apples. Apples cost £1.18 per kg. How much does Aisha pay for her apples?  
(b) Silk fabric is sold for £7.45 per metre. Isla needs 2.8 metres of fabric. How much will this cost?  
(c) Car hire costs £24.25 per hour. Ewan hires a car for 4.5 hours. How much will he pay?

# Problem Solving

## Multiplying Decimals

Fill in the gaps

$$0.8 \times 0.3 = \square \times 0.6 = 2 \times \square$$

$$0.12 \times \square = 0.3 \times 4 = 200 \times \square$$

$$0.7 \times 0.4 = \square \times 0.2 = 2 \times \square$$

$$0.12 \times \square = 0.3 \times 2 = 20 \times \square$$

Circle the correct answer in each row

$0.3^2$	0.9	0.09	0.009
$0.2^4$	0.0016	0.16	0.016
$0.1^5$	0.000001	0.00001	0.0001
$0.9^2$	8.1	0.18	0.81
$1.2^2$	1.44	0.144	14.4
$(-0.1)^3$	-0.0001	-0.001	0.001

Try to make the target number using the numbers (no more than once)

10	0.1	100	4	0.07	Target 28
----	-----	-----	---	------	--------------

0.03	50	25	40	0.4	Target 150
------	----	----	----	-----	---------------

80	0.1	30	3	0.1	Target 2.4
----	-----	----	---	-----	---------------

$\square \times \square$	$\times$	$\square \times \square$	$\times$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$
$\square \times \square$	$\times$	$\square \times \square$	$\times$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$
$\square \times \square$	$\times$	$\square \times \square$	$\times$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$
$\square \times \square$	$\times$	$\square \times \square$	$\times$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$	$=$	$\square \times \square$

# Problem Solving

## Multiplying Decimals

Calculate the following:

$300 \times 200$
$300 \times 20$
$300 \times 2$
$300 \times 0.2$
$300 \times 0.02$
$30 \times 0.02$
$3 \times 0.02$
$0.3 \times 0.02$
$0.03 \times 0.02$

Which is the odd one out?

<b>A</b>	$0.4 \times 0.6$
<b>B</b>	$30 \times 0.08$
<b>C</b>	$1.2 \times 0.2$
<b>D</b>	$0.024 \times 10$

Calculate the following:

$0.02^2$
$0.02^3$
$0.02^4$
$0.02^5$

Which is the odd one out?

<b>A</b>	$0.2 \times 0.4 \times 0.6$
<b>B</b>	$6 \times 0.001 \times 8$
<b>C</b>	$12 \times 0.04 \times 0.1$
<b>D</b>	$10 \times 0.024 \times 0.02$

Which of the following are incorrect?

$0.1 \times 0.1 \times 0.1 = 0.003$
$1.2^2 = 1.44$
$0.13 \times 20 \times 0.1 = 0.26$
$0.3^3 = 2.7$

Which is the odd one out?

<b>A</b>	$0.01^2$
<b>B</b>	$0.1^4$
<b>C</b>	$0.0001^1$
<b>D</b>	$0.001^2$

Use the 6 tiles to make 3 equal calculations

0.04	0.6	2
1.8	90	6


Fill in the gaps so the calculation are true

$0.5 \times$	$=$	$\times 500$
$\times 3 =$		$\times 0.02$
$40 \times$	$= 0.1 \times$	
$8 \times$	$=$	$\times 20$

# More-Same-Less – Decimal Multiplication

Instructions: Calculate the value in the middle box. Complete the remaining boxes with calculations by making the minimum change possible to the centre box.



Value of the Multiplicand

	Less	Same	More
More			
Same		0.8 × 0.4 =	
Less			

Number of digits in the product

# Fluency Practice

Work out:

1)  $46.27 \div 7$

2)  $174.21 \div 3$

3)  $189.72 \div 9$

4)  $568.8 \div 6$

5)  $11128.8 \div 4$

6)  $1261.6 \div 8$

7)  $1039.5 \div 7$

8)  $1360.8 \div 6$

9)  $1206.64 \div 8$

10)  $249.9 \div 7$



# Fluency Practice

Question 1: Work out

- |                   |                   |                   |                   |
|-------------------|-------------------|-------------------|-------------------|
| (a) $4.6 \div 2$  | (b) $6.5 \div 5$  | (c) $9.6 \div 3$  | (d) $8.4 \div 4$  |
| (e) $7.2 \div 3$  | (f) $6.8 \div 4$  | (g) $18.5 \div 5$ | (h) $9.6 \div 8$  |
| (i) $14.4 \div 6$ | (j) $27.9 \div 9$ | (k) $9.1 \div 7$  | (l) $36.5 \div 5$ |
| (m) $33.2 \div 4$ | (n) $19.2 \div 3$ | (o) $27.6 \div 6$ | (p) $42.4 \div 8$ |

Question 2: Work out

- |                    |                    |                     |                      |
|--------------------|--------------------|---------------------|----------------------|
| (a) $3.96 \div 3$  | (b) $0.75 \div 5$  | (c) $8.56 \div 4$   | (d) $0.528 \div 6$   |
| (e) $5.81 \div 7$  | (f) $0.657 \div 9$ | (g) $2.176 \div 8$  | (h) $0.238 \div 7$   |
| (i) $0.119 \div 7$ | (j) $0.072 \div 6$ | (k) $2.556 \div 3$  | (l) $3.325 \div 5$   |
| (m) $701.2 \div 4$ | (n) $9.927 \div 9$ | (o) $12.065 \div 5$ | (p) $0.16024 \div 4$ |

Question 3: Work out

- |                    |                    |                   |                   |
|--------------------|--------------------|-------------------|-------------------|
| (a) $1.3 \div 2$   | (b) $2.9 \div 2$   | (c) $1.4 \div 5$  | (d) $24.3 \div 5$ |
| (e) $5.4 \div 4$   | (f) $0.038 \div 5$ | (g) $1.4 \div 8$  | (h) $2.13 \div 6$ |
| (i) $0.284 \div 8$ | (j) $54.3 \div 6$  | (k) $47.5 \div 8$ | (l) $7.42 \div 3$ |

Question 4: Work out the following divisions

- |                     |                     |                      |                     |
|---------------------|---------------------|----------------------|---------------------|
| (a) $8.4 \div 12$   | (b) $0.143 \div 11$ | (c) $34.5 \div 15$   | (d) $0.322 \div 14$ |
| (e) $2.266 \div 22$ | (f) $7.68 \div 12$  | (g) $0.56 \div 16$   | (h) $15.75 \div 25$ |
| (i) $2.12 \div 40$  | (j) $77.25 \div 75$ | (k) $0.9936 \div 23$ | (l) $3.52 \div 110$ |

# Extension

Question 1: Four friends share £6.52 equally.  
How much do they each receive?

Question 2: James has 3.65m of rope into 5 pieces of equal length.  
How long is equal piece of rope?



Question 3: The perimeter of a square is 53.3cm.  
Work out the length of equal side.



Perimeter = 53.3cm

Question 4: SuperSaver sells 6 eggs for £1.14  
TopBuys sells 8 eggs for £1.68  
BestBuys sells 12 eggs for £2.64

Which shop is best value?

Question 5: Roger is organising a trip to a museum.  
The total price of the tickets is £103.50  
The total price for the coach is £64.80  
If nine people are going on the trip, how much should they pay each?



Question 6: A shop charges 12p to photocopy one page in full colour.  
Sam has photocopied some pages in colour and the total cost is £16.08  
How many pages did he photocopy?



Question 7: The perimeter of a regular octagon is 4.096cm  
Calculate the length of each side.

# Fluency Practice

Work out:

1)  $0.4 \div 0.002$

2)  $1.6 \div 0.004$

3)  $1.8 \div 0.009$

4)  $0.027 \div 0.9$

5)  $0.03 \div 0.1$

6)  $0.04 \div 0.02$

7)  $0.024 \div 0.06$

8)  $0.16 \div 0.008$

9)  $5.5 \div 0.011$

10)  $3 \div 0.6$

# Fluency Practice

Question 1: Work out

- |                      |                     |                      |                      |
|----------------------|---------------------|----------------------|----------------------|
| (a) $6 \div 0.2$     | (b) $4 \div 0.5$    | (c) $12 \div 0.3$    | (d) $2 \div 0.1$     |
| (e) $25 \div 0.5$    | (f) $15 \div 0.3$   | (g) $0.8 \div 0.2$   | (h) $0.9 \div 0.3$   |
| (i) $1.4 \div 0.2$   | (j) $3 \div 0.6$    | (k) $14 \div 0.7$    | (l) $2.4 \div 1.2$   |
| (m) $3.5 \div 0.5$   | (n) $45 \div 1.5$   | (o) $0.15 \div 0.5$  | (p) $0.72 \div 0.2$  |
| (q) $0.48 \div 0.3$  | (r) $0.36 \div 0.9$ | (s) $0.048 \div 0.2$ | (t) $0.095 \div 0.5$ |
| (u) $0.072 \div 0.6$ | (v) $1.05 \div 0.5$ | (w) $4.29 \div 0.3$  | (x) $0.784 \div 0.7$ |

Question 2: Work out the following

- |                       |                        |                       |                       |
|-----------------------|------------------------|-----------------------|-----------------------|
| (a) $2 \div 0.05$     | (b) $3 \div 0.02$      | (c) $6 \div 0.03$     | (d) $12 \div 0.04$    |
| (e) $15 \div 0.01$    | (f) $60 \div 0.06$     | (g) $0.08 \div 0.04$  | (h) $0.06 \div 0.02$  |
| (i) $0.4 \div 0.05$   | (j) $0.8 \div 0.02$    | (k) $0.27 \div 0.09$  | (l) $0.28 \div 0.07$  |
| (m) $1.2 \div 0.06$   | (n) $4.9 \div 0.07$    | (o) $0.058 \div 0.02$ | (p) $0.075 \div 0.05$ |
| (q) $1.278 \div 0.06$ | (r) $0.0476 \div 0.07$ | (s) $360 \div 0.12$   | (t) $45 \div 0.15$    |

Question 3: Work out

- |                        |                     |                       |                      |
|------------------------|---------------------|-----------------------|----------------------|
| (a) $0.6 \div 0.02$    | (b) $34 \div 0.2$   | (c) $0.9 \div 0.5$    | (d) $2.4 \div 0.08$  |
| (e) $6 \div 0.005$     | (f) $12 \div 0.1$   | (g) $1.4 \div 0.04$   | (h) $0.066 \div 0.3$ |
| (i) $0.06 \div 0.15$   | (j) $20 \div 0.004$ | (k) $2.672 \div 0.08$ | (l) $2.75 \div 0.05$ |
| (m) $0.275 \div 0.005$ | (n) $750 \div 2.5$  | (o) $5.6 \div 0.004$  | (p) $360 \div 1.2$   |

# Extension

Question 1: A sweet cost £0.04  
How many sweets can I buy for £20?

Question 2: Mia has 20 metres of ribbon.  
She is cutting it into pieces that are 0.8m long.  
How many 0.8m pieces of ribbon will she have?

Question 3: Yasmin has £17 in five pence pieces.  
How many five pence pieces does she have?



Question 4: Find the missing numbers

$$0.4 \times \square = 20.8$$

$$0.7 \times \square = 45$$

Question 5: A teacher is placing textbooks that are 2.5cm thick on a bookshelf.  
The teacher wants to place 60 textbooks on the shelf.  
The bookshelf is 160cm long.  
Does the teacher have enough room on the bookshelf for the textbooks?



Question 6: A grain of rice has a mass of 0.015g  
How many grains are there in 300g of rice?

Question 7: A type of pebble has a mass of 0.8g  
How many pebbles are there in 40kg?

Question 8: Use approximations to estimate the answer to the following

(a) 
$$\frac{9.89^2}{0.502}$$

(b) 
$$\frac{6.97 \times 201.82}{0.391}$$

(c) 
$$\frac{1802.7 - 397.2}{0.699}$$

# Fluency Practice

## Dividing Decimals

Calculate:

a)  $8 \div 0.2$

b)  $15 \div 0.3$

c)  $28 \div 0.4$

d)  $32 \div 0.2$

e)  $18 \div 0.3$

f)  $42 \div 0.6$

g)  $124 \div 0.2$

h)  $64 \div 0.4$

i)  $91 \div 0.7$

j)  $8.4 \div 2$

k)  $2.4 \div 3$

l)  $8.1 \div 3$

m)  $3.6 \div 6$

n)  $12.8 \div 4$

o)  $10.2 \div 6$

p)  $9.5 \div 5$

q)  $7.2 \div 4$

r)  $9.8 \div 7$

s)  $1.02 \div 0.6$

t)  $0.64 \div 0.04$

u)  $1.6 \div 0.05$

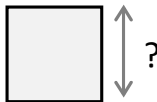
v)  $0.135 \div 0.5$

1) A pencil costs £0.04. How many pencils can you purchase for £5?

2) 5 friends share £7.60. How much do each of them get?

3) Carlos has £20 in 2p coins, how many 2p coins does he have?

4) The perimeter of this square is 9.4 cm.



What is the length of each side?

5) Find the missing number in this calculation  $2.56 \times \boxed{?} = 0.768$

6) A regular pentagon has perimeter of 16.25 cm.

What is the length of each side? Give the answer in centimetres.

# Fluency Practice

Calculate:

- (a)  $333 \div 9$       (b)  $4152 \div 8$   
(c)  $1442 \div 7$       (d)  $1170 \div 6$   
(e)  $196 \div 5$       (f)  $813 \div 4$   
(g)  $622 \div 8$       (h)  $513 \div 6$

Calculate:

- (a)  $192.5 \div 5$       (b)  $225.2 \div 4$   
(c)  $106.8 \div 6$       (d)  $385.6 \div 6$   
(e)  $305.5 \div 5$       (f)  $307.3 \div 7$   
(g)  $184.5 \div 3$       (h)  $735.3 \div 9$

Calculate:

- (a)  $76.5 \div 0.5$       (b)  $164 \div 0.4$   
(c)  $127 \div 0.2$       (d)  $252.6 \div 0.6$   
(e)  $442.2 \div 1.1$       (f)  $14.08 \div 0.08$   
(g)  $22.2 \div 0.04$       (h)  $116.76 \div 0.12$

(a) A baker has 3 kg of flour. If each cake requires 0.2 kg of flour, how many cakes can the baker make?

(b) A pile of books is 12 cm high. If each book is 0.8 cm thick, how many books are there in the pile?

(c) A bottle contains 2.4 litres of lemonade. If each glass contains 0.3 litres, how many glasses of lemonade can be filled from the bottle?

(a) A string of sausages is 1.26 m in length. If each sausage is 0.18 m long, how many sausages are there?

(b) A milkman is carrying a crate which contains 12 bottles of milk and weighs 11.5 kg. If the crate weighs 0.7 kg, how much does each bottle of milk weigh?

# Problem Solving

## Dividing Decimals

$$12 \div 3 =$$

$$42 \div 7 =$$

$$1.2 \div 3 =$$

$$4.2 \div 7 =$$

$$1.2 \div 0.3 =$$

$$4.2 \div 0.7 =$$

$$1.2 \div 30 =$$

$$4.2 \div 0.6 =$$

$$0.12 \div 30 =$$

$$0.42 \div 60 =$$

## Solve for x

$$1.) \frac{24}{0.6} = x$$

$$4.) \frac{6}{0.12} = x$$

$$2.) \frac{24}{x} = 0.6$$

$$5.) \frac{6}{x} = 0.5$$

$$3.) \frac{x}{0.4} = 0.6$$

$$6.) \frac{x}{0.5} = 1.2$$

$$1.) \frac{2000}{4} =$$

$$2.) \frac{200}{4} =$$

$$3.) \frac{20}{4} =$$

$$4.) \frac{2}{4} =$$

$$5.) \frac{0.2}{4} =$$

$$6.) \frac{0.02}{4} =$$

$$7.) \frac{2}{40} =$$

$$8.) \frac{2}{400} =$$

$$9.) \frac{2}{4000} =$$

×				
	0.8	0.6	1	
	4.4	3.3	0.55	
	0.28	0.21	0.035	



# Decimal Addition and Subtraction

practice makes perfect: decimal addition and subtraction (show your workings)

1)

$$5.4 + 7 =$$

2)

$$12.4 - 5.5 =$$

3)

$$3.76 + 0.4 + 0.84 =$$

4)

$$5 - 1.24 =$$

5)

$$1.37 + 0.03 + 3.6 =$$

6)

$$5 - 1.36 =$$

7)

$$0.9 + 0.33 =$$

8)

$$0.35 + 0.88 =$$

9)

$$1.23 - 0.86 =$$

10)

$$6.9 + 2.97 =$$

11)

$$9.87 - 2.98 =$$

12)

$$7.871 + 1.999 =$$

13)

$$11 - 6.4 =$$

$$11 - 1.9 =$$

what happens?

give three other sums with the same property

state the pattern and try to give a reason for the property

14)

$$39 - 3.9 =$$

$$57 - 5.7 =$$

$$41 - 4.1 =$$

$$77 - 7.7 =$$

$$48 - 4.8 =$$

$$36 - 3.6 =$$

$$68 - 6.8 =$$

$$14 - 1.4 =$$

what happens?

try to find some other pairs of sums with the same property

15)

(a)

		3.6
1.8		
2.4		1.2

(b)

2.4		5
		3

magic squares:

any line of three: across, down or diagonally must have the same total (sum)

# Decimal Multiplication

## practice makes perfect: decimal multiplication

(show your steps)

1)

$$0.6 \times 0.4$$

2)

$$0.2 \times 1.2$$

3)

$$1.5 \times 0.6$$

4)

$$2 \times 0.45$$

5)

$$3.75 \times 0.8$$

6)

$$5.75 \times 0.6$$

7)

$$8.625 \times 0.4$$

8)

$$2.55 \times 0.3$$

9)

$$1.7 \times 0.45$$

10)

$$0.9 \times 0.211$$

11)

$$0.9 \times 9.11$$

12)

$$8.23 \times 0.15$$

13)

use

$$33 \times 67 = 2211$$

to write down the answer to:

(a)  $3.3 \times 6.7$

(b)  $0.33 \times 67$

(c)  $0.33 \times 0.67$

(d)  $0.033 \times 6.7$

(e)  $33 \times 0.00067$

(f)  $0.00333 \times 0.0067$

14)

work out

(a)  $3 \times 85.47 \times 1.3$

(b)  $5 \times 85.47 \times 1.3$

(c)  $7 \times 85.47 \times 1.3$

(d)  $8 \times 85.47 \times 1.3$

15)

work out

(a)  $0.2^2 + 0.8$  and  $0.8^2 + 0.2$

(b)  $0.7^2 + 0.3$  and  $0.3^2 + 0.7$

(c)  $0.1^2 + 0.9$  and  $0.9^2 + 0.1$

(d)  $0.4^2 + 0.6$  and  $0.6^2 + 0.4$

try to give a general rule and test it out

try to give a general rule and test it out

# Decimal Division

practice makes perfect: decimal division

(show your steps)

1)

$$4.8 \div 1.2$$

2)

$$4.8 \div 0.8$$

3)

$$0.8 \times \square = 0.76$$

4)

$$0.4 \times \square = 1.8$$

5)

$$49.38 \div 0.4$$

6)

$$98.76 \div 0.5$$

7)

$$1.1725 \div 0.05$$

8)

$$28.14 \div 1.2$$

9)

$$2.1 \div 1.2$$

10)

$$5.4 \div 4.5$$

11)

$$7.458 \div 1.1$$

12)

$$6.237 \div 1.1$$

13)

which is bigger:

$$\frac{2.07}{1.2} - \frac{2.07}{1.5}$$

or

$$\frac{2.07}{1.5} - \frac{2.07}{1.8} \quad ?$$

14)

work out

(i)  $n - d$

(ii)  $n \div d$

when:

(a)  $n = 4.5, d = 3$

(b)  $n = 6.25, d = 5$

(c)  $n = 7.2, d = 6$

(d)  $n = 1.44, d = 0.2$

(e)  $n = 4.05, d = 1.8$

15)

use

$$3.6 \div 14.4 = 0.25$$

to write down the answer to

(a)  $0.36 \div 14.4$

(b)  $3.6 \div 1.44$

(c)  $0.36 \div 144$

(d)  $0.036 \div 0.0144$

(e)  $0.025 \times 1.44$

# Multiplying and Dividing Decimals Match

Work out each calculation and tick off your answers at the bottom as you go:

A  $42 \div 100 = \underline{\hspace{2cm}}$

B  $\frac{6}{0.1} = \underline{\hspace{2cm}}$

C  $0.3 \times 0.4 = \underline{\hspace{2cm}}$

D  $\frac{12}{0.3} = \underline{\hspace{2cm}}$

E  $8 \times 0.2 = \underline{\hspace{2cm}}$

F  $0.94 \times 1000 = \underline{\hspace{2cm}}$

G  $1.6 \div 2 = \underline{\hspace{2cm}}$

H  $\frac{2.5}{5} = \underline{\hspace{2cm}}$

I  $\frac{36}{60} = \underline{\hspace{2cm}}$

J  $\frac{18}{0.9} = \underline{\hspace{2cm}}$

K  $0.08 \times 3 = \underline{\hspace{2cm}}$

M  $36 \div 0.1 = \underline{\hspace{2cm}}$

O  $\frac{0}{5} = \underline{\hspace{2cm}}$

P  $\frac{5}{0} = \underline{\hspace{2cm}}$

L  $\frac{9}{30} = \underline{\hspace{2cm}}$

N  $0.6 \times 60 = \underline{\hspace{2cm}}$

S  $15 \div 300 = \underline{\hspace{2cm}}$

Q  $0.2 \times 900 = \underline{\hspace{2cm}}$

R  $\frac{12}{0.5} = \underline{\hspace{2cm}}$

V  $\frac{6}{0.02} = \underline{\hspace{2cm}}$

W  $\frac{1.9}{0.1} = \underline{\hspace{2cm}}$

T  $0.4 \div 10 = \underline{\hspace{2cm}}$

U  $\frac{4}{200} = \underline{\hspace{2cm}}$

X  $\frac{0.8}{8} = \underline{\hspace{2cm}}$

Y  $0.6 \times 0.9 = \underline{\hspace{2cm}}$

Z  $2.2 \div 11 = \underline{\hspace{2cm}}$

jumbled answers

- |           |      |     |      |      |      |
|-----------|------|-----|------|------|------|
| 36        | 0.5  | 0.1 | 19   | 180  | 0.05 |
| undefined | 20   | 0.2 | 0.6  | 940  | 0.54 |
| 0.3       | 0.12 | 300 | 360  | 0.42 | 40   |
| 1.6       | 24   | 0.8 | 0.24 | 0.04 | 0.02 |
|           |      |     |      | 60   | 0    |

# Fluency Practice

practice makes perfect: decimals (without a calculator)

1) $3.6 + 4$	2) $2.57 \times 10$	3) $5.65 + 3.35$	4) $£5 - £2.36$	5) $£10 - £4.55$	6) $£20 - £11.09$
7) $3.84 \times 10$	8) $2.74 + 0.5$	9) $5.7 + 3 + 2.1$	10) $£5 - £1.18$	11) $£10 - £3.81$	12) $11.09 \times 1000$
13) $7.63 \div 10$	14) $0.3 \div 10$	15) $3.2 + 2 - 2.8$	16) $7 \times 0.8$	17) $0.7 \times 0.8$	18) $5.61 \div 100$
19) $3.5 - 8.1$	20) $0.25 \times 42$	21) 3 lots of $\$7.42$	22) $3.14 \div 200$	23) $0.165 \div 0.11$	24)

# Operating on 3.142

practice makes perfect: decimals

find the result, starting with 3.142 each time (not using a calculator)

1) 
$$\begin{array}{r} 3.142 \\ + 0.03 \\ \hline \end{array}$$

2) 
$$\begin{array}{r} 3.142 \\ - 2 \\ \hline \end{array}$$

3) 
$$\begin{array}{r} 3.142 \\ \times 10 \\ \hline \end{array}$$

4) 
$$\begin{array}{r} 3.142 \\ + 0.008 \\ \hline \end{array}$$

5) 
$$\begin{array}{r} 3.142 \\ + 0.9 \\ \hline \end{array}$$

6) 
$$\begin{array}{r} 3.142 \\ \times 100 \\ \hline \end{array}$$

7) 
$$\begin{array}{r} 3.142 \\ + 17 \\ \hline \end{array}$$

8) 
$$\begin{array}{r} 3.142 \\ - 0.05 \\ \hline \end{array}$$

9) 
$$\begin{array}{r} 3.142 \\ \times 20 \\ \hline \end{array}$$

10) 
$$\begin{array}{r} 3.142 \\ \div 100 \\ \hline \end{array}$$

11) 
$$\begin{array}{r} 3.142 \\ - 2.7 \\ \hline \end{array}$$

12) 
$$\begin{array}{r} 3.142 \\ \times 3 \\ \hline \end{array}$$

13) 
$$\begin{array}{r} 3.142 \\ - 0.0009 \\ \hline \end{array}$$

14) 
$$\begin{array}{r} 3.142 \\ - 0.052 \\ \hline \end{array}$$

15) 
$$\begin{array}{r} 3.142 \\ \times 4 \\ \hline \end{array}$$

16) 
$$\begin{array}{r} 3.142 \\ \div 2 \\ \hline \end{array}$$

17) 
$$\begin{array}{r} 3.142 \\ - 0.242 \\ \hline \end{array}$$

18) 
$$\begin{array}{r} 3.142 \\ \times 5 \\ \hline \end{array}$$

19) 
$$\begin{array}{r} 3.142 \\ + 0.858 \\ \hline \end{array}$$

20) 
$$\begin{array}{r} 3.142 \\ + 6.968 \\ \hline \end{array}$$

21) 
$$\begin{array}{r} 3.142 \\ \div 50 \\ \hline \end{array}$$

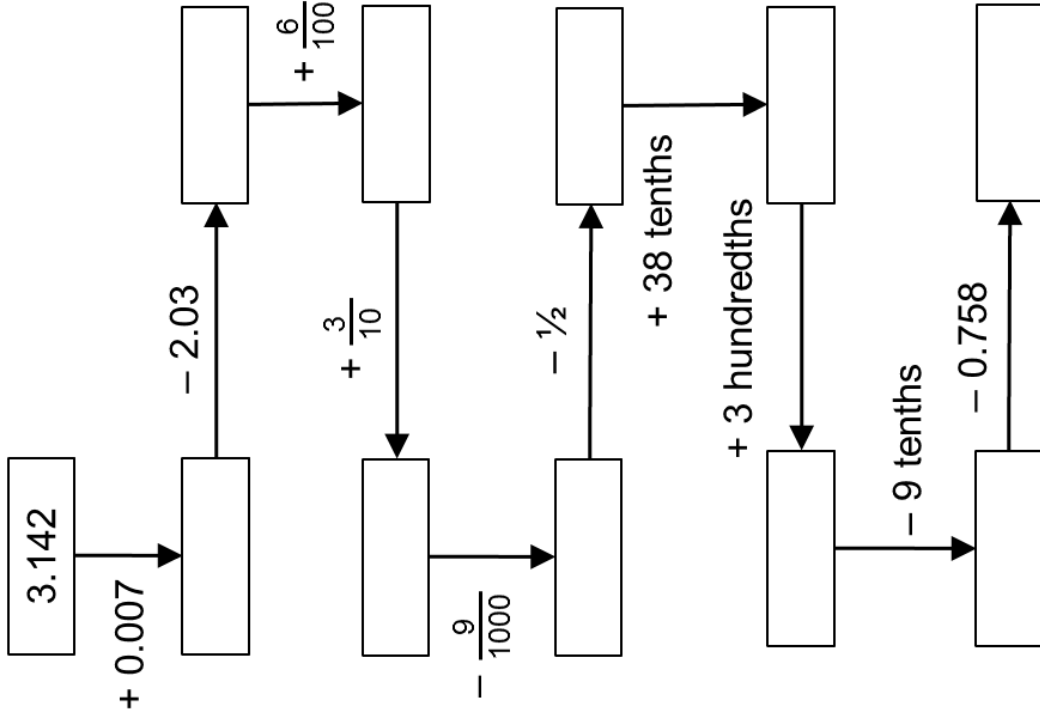
22) 
$$\begin{array}{r} 3.142 \\ \times 11 \\ \hline \end{array}$$

23) 
$$\begin{array}{r} 3.142 \\ - 5 \\ \hline \end{array}$$

24) 
$$\begin{array}{r} 3.142 \\ \times 3\frac{1}{2} \\ \hline \end{array}$$

# Operating on 3.142

stepping out from 3.142



operating on 3.142

- (1)  $+ 0.03 =$
- (2)  $- 2 =$
- (3)  $\times 10 =$
- (4)  $+ 0.008 =$
- (5)  $+ 0.9 =$
- (6)  $- 0.2 =$
- (7)  $\times 100 =$
- (8)  $+ 0.058 =$
- (9)  $+ 0.86 =$
- (10)  $- 0.05 =$
- (11)  $\times 2000 =$
- (12)  $+ 0.858 =$
- (13)  $+ 0.99 =$
- (14)  $- 2.7 =$
- (15)  $\times 200 =$
- (16)  $\times 5 =$

start with 3.142 each time

# Decimal Problems

A) Which calculation gives an answer closest to 1?

- A)  $0.83 \div 10$
- B)  $0.95 \times 10$
- C)  $0.07 \times 10$
- D)  $1.1 \div 10$

B) Emma earns £9.85 per hour. How much does she earn if she works for 8 hours?

C) A rectangular room is 3.6m wide by 5.2m long. Calculate the area of the room.

D) A 1kg bag of potatoes costs £1.18. Emma needs to buy 12 of these bags. How much change would she get from £20?

E)  $12 \times 0.8 = 8 \times ?$

F) Three of the numbers below add up to exactly 1. Which three?

- A) 0.89
- B) 0.001
- C) 0.09
- D) 0.1
- E) 0.99
- F) 0.01

G) How many 5p coins would you need to make £5 million?

H) Calculate  $4.2 \times 0.003$

I) Which number is half way between 1.89 and 1.90?

J) A 2.5 litre bottle of lemonade is poured into cups. Each cup is filled with 300ml of lemonade. How many full cups can be poured?

K) Calculate  $15.99 - 0.0345$



# Problem Solving

## Problem Card 1 – Make 50

$$15.6 + A = 50$$

$$B + 39.1 = 50$$

$$A + B + C = 50$$

Work out the value of A, B and C.

## Problem Card 2 – Number sentence

Can you use five of the digits 1 to 9 to make this number sentence true?

$$\square \square \cdot \square + \square \cdot \square = 41.7$$

Can you find other sets of five digits to make this number sentence true?

## Problem Card 3

Geoff buys the following items.

He starts with £200

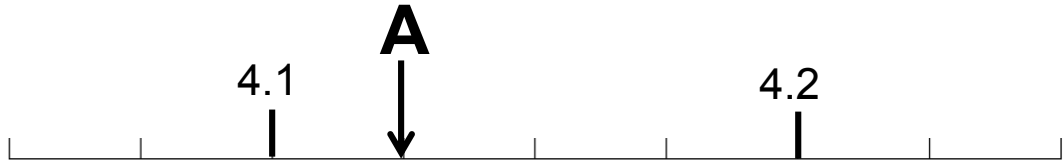


How much does he have left once he has bought everything?

# Problem Solving

## Problem Card 4

Look at these number lines.



Find the difference between A and B

## Problem Card 5 – Missing Digits

Can you work out the missing digits in these calculations?

	3	<input type="text"/>	• 1	<input type="text"/>
+		4	• 2	3
	<input type="text"/>	5	• <input type="text"/>	2

	7	7	<input type="text"/>	• 9
–	<input type="text"/>	<input type="text"/>	8	• <input type="text"/>
	4	4	4	• 4

# Decimal Addition and Subtraction Explorations

## practice makes perfect: decimal addition and subtraction explorations

### i) four consecutive digits

$$\square\square - \square \cdot \square$$

use any four consecutive numbers e.g. 2, 3, 4 and 5

place the numbers in the boxes (using all of the numbers) e.g. using 2, 3, 4 and 5 you could have

$$34 - 5.2 = 28.8 \text{ (the result)}$$

where do you put the four numbers to get:

- the highest possible result?
- the lowest?

subtract the lowest result from the largest

explore what happens for various sets of four consecutive numbers

try to explain this result

### ii) reverse the number and subtract

$$4.263 - 3.624 =$$

$$8.135 - 5.318 =$$

$$8.374 - 4.738 =$$

$$6.753 - 3.576 =$$

$$7.932 - 2.397 =$$

$$6.312 - 2.136 =$$

what patterns can be found in the digits of the results?

check to see that these patterns continue

what happens for numbers with two decimal places when they are reversed and subtracted?  
e.g.  $6.72 - 2.76$

### iii) issuu

$$\begin{array}{r} \square - 0 \cdot \square \\ \square \cdot \square + \square \end{array} \quad +$$

put the numbers 2, 3, 4, 5 and 6 in any of the boxes

$$\begin{array}{r} \text{e.g. } 4 - 0.6 = 3.4 \\ 3.2 + 5 = \underline{8.2} \\ 11.6 \text{ (the result)} \end{array}$$

can you find other ways to obtain this result of 11.6?

can you find six ways to obtain a result of 8.9?

can you find six ways to obtain a result of 15.1?

these are three of the different results

try to find as many different results as you can  
(the answer is more than 15)

# Decimal Multiplication Explorations

## practice makes perfect: decimal multiplication explorations

i) use 2, 3, 4 and 5 once only

$$\square \cdot \square \times \square \cdot \square$$

how close can you get to 10?

what is the largest result?

what is the smallest?

how close can you get to 13.56?

establish that there are 12 different results altogether

what happens when you swap the tenths digits over  
e.g. compare  $4.5 \times 3.2$  with  $4.2 \times 3.5$ ?

ii) generalising possibilities

work out:

a)  $2 \times 2$

b)  $5 \times 1.25$

c)  $11 \times 1.1$

d)  $3 \times 1.5$

e)  $6 \times 1.2$

f)  $9 \times 1.125$

g)  $21 \times 1.05$

h)  $51 \times 1.02$

these are all examples of sums with an unusual result

state a rule for these sums

try to give a general (family) pattern

iii) simultaneously true

work out what the two numbers are if:

a)  $p + q = 3$  and  $p \times q = 1.44$

b)  $k + m = 6$  and  $k \times m = 8.91$

c)  $t + w = 5$  and  $t \times w = 5.25$

d)  $n + r = 10$  and  $n \times r = 3.84$

e)  $a + c = 10$  and  $a \times c = 11.9679$

f)  $d + c = 1$  and  $d \times c = 0.2275$

g)  $b + h = 1$  and  $b \times h = 0.2491$

h)  $e + r = 1$  and  $e \times r = 0.0291$

explore sums similar to parts (g) and (h)

state a rule for these sums

state what you notice about the results

# Decimal Multiplication

decimal multiplication and division without a calculator

(1)

(a)

x	0.8	1.2
5		
	0.4	

(b)

x	0.5	
	2	6
1.5		

(c)

x	0.6	
	2.1	
2		2.8

(d)

x		0.2
3	5.4	
2.5		

(2)

(a)

x	3	
	4.5	3
2.5		

(b)

x	4.5	
2.2		
1.8		0.9

(c)

x	3.2	1.8
3.5		
	1.6	

(d)

x	1.5	3.5
	3.6	
1.6		

(3)

(a)

x	0.5	
	3	
2		1.4

(b)

x	0.4	
3		2.4
		4

(c)

x	0.3	
5		4.5
	0.9	

(d)

x	1.1	
	7.15	0.65
		0.15

# Decimal Steps

## decimal steps (i)

you are only allowed to use these 'steps' – with repeats if you like

A: + 0.1  
B:  $\times 5$   
C:  $\times 2$

- (1) starting with 2.4 how can you get to:
- (a) 24.1 in 3 steps?
  - (b) 24.2 in 3 steps?
  - (c) 24.5 in 3 steps?
  - (d) 24.3 in 4 steps?
  - (e) 24.4 in 4 steps?

- (2) using the operations above and just 2 steps, how can you change:

- (a) 3.6 to 7.3?
- (b) 4.2 to 21.5?
- (c) 2.9 to 29?
- (d) 0.8 to 1.7?
- (e) 3.9 to 19.6?

(3)

you are only allowed to use these 'steps' – with repeats if you like

A: + 1.5  
B:  $\times 0.3$   
C:  $\times 2$

using the operations above and just 2 steps, how can you change:

- (a) 8.5 to 20?
- (b) 20 to 7.5?
- (c) 7.5 to 4.5?
- (d) 4.5 to 1.8?
- (e) 1.8 to 5.1?

(4)

all of the changes below need exactly 2 steps – what could the operations be?

A: ?  
B: ?  
C: ?

- (a) 3 to 9.6
  - (b) 1 to 6
  - (c) 0.8 to 2
  - (d) 1.2 to 2.8
  - (e) 5 to 15.6
- there is more than one answer

# Decimal Steps

## decimal steps (ii)

- A: + 1  
B:  $\times 5$   
C:  $\times 2$   
D:  $-0.1$

you are only allowed to use these 'steps' – with repeats if you like

- (1) using these operations, how can you change from:

- (a) 0.3 to 2.6 in 2 steps?
- (b) 2 to 3.8 in 2 steps?
- (c) 0.9 to 4 in 2 steps?
- (d) 5 to 9.8 in 2 steps?
- (e) 3.6 to 17.9 in 2 steps?

- (2) using the operations above, how can you change:

- (a) 1.1 to 3.1 in 3 steps?
- (b) 11 to 109.8 in 3 steps?
- (c) 2.3 to 5.5 in 3 steps?
- (d) 5 to 29.9 in 3 steps?
- (e) 10.1 to 22 in 3 steps?

find alternative answers if you can

(3)

- A: + 5  
B:  $\times 0.1$   
C:  $\times 2$

you are only allowed to use these 'steps' – with repeats if you like

how can you change from:

- (a) 3 to 0.8 in 2 steps?
- (b) 4 to 0.8 in 2 steps?
- (c) 5 to 1 in 2 steps?
- (d) 0.6 to 6.2 in 2 steps?
- (e) 3.5 to 17 in 2 steps?

(4)

- A: ?  
B: ?  
C: ?

all of the five changes below need exactly 2 steps – what could the three steps be?

- (a) 4 to 1.2
- (b) 0.3 to 5
- (c) 8 to 3.6
- (d) 0.5 to 4.5
- (e) 3.2 to 6.4

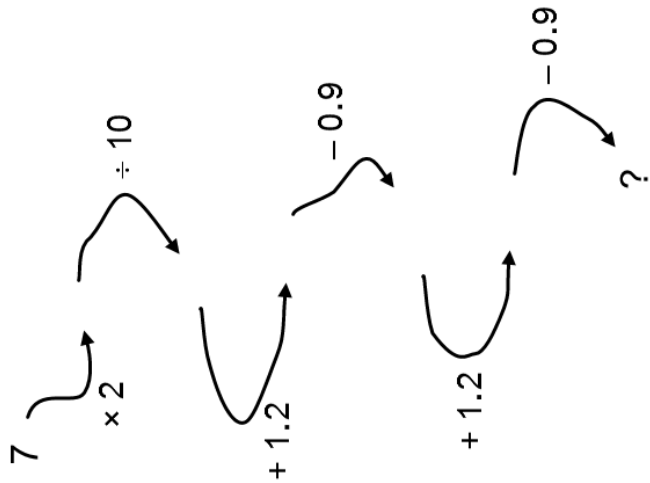
is there more than one answer?

# Decimal Steps

## decimal steps (iii)

- A: + 1.2  
 B:  $\times 2$   
 C:  $\div 10$   
 D: - 0.9

you are only allowed to use these 'steps' - with as many repeats as you like



(1) using these operations, state the steps in changing from 36 to 15:

- (a)  $36 \rightarrow 72 \rightarrow 7.2 \rightarrow 8.4 \rightarrow 7.5 \rightarrow 15$   
 (b)  $36 \rightarrow 3.6 \rightarrow 7.2 \rightarrow 6.3 \rightarrow 7.5 \rightarrow 15$   
 (c)  $36 \rightarrow 3.6 \rightarrow 7.2 \rightarrow 6.3 \rightarrow 12.6 \rightarrow 13.8 \rightarrow 15$

(2) using these operations, how can you change from:

- (a) 8 to 4 in 3 steps?  
 (b) 36 to 6 in 3 steps?  
 (c) 15 to 6 in 3 steps?  
 (d) 45 to 0 in 4 steps?  
 (e) 5 to 13 in 4 steps?  
 (f) 4 to 11 in 4 steps?  
 (g) 3 to 15 in 5 steps?  
 (h) 36 to 12 in 5 steps?  
 (i) 15 to 9 in 5 steps?  
 (j) 15 to 10 in 6 steps?

find alternative answers if you can

and/or make up your own questions



# Decimal Multiplication Targets

use a calculator to find digits to fit in the boxes to make the sum true – not normally the same digit in each box

(1)  $1.\square \times 1.\square = 2.1$

(2)  $2.\square \times 0.\square = 2.1$  (two answers)

(3)  $1.\square \times 1.\square = 2.1$

(4)  $1.\square \times 1.\square = 2.1$

(5)  $1.\square \times 1.\square = 2.09$

(6)  $1.\square \times 1.\square = 2.08$

(7)  $1.\square \times 1.\square = 2.07$  (two answers)

(8)  $2.\square \times 1.\square = 2.06$

(9)  $1.\square \times 1.\square = 2.05$

(10)  $1.\square \times 1.\square = 2.04$

(11)  $1.\square \times 1.\square = 2.04$

(12)  $1.\square \times 1.\square = 2.03$

(13)  $1.\square \times 1.\square = 2.03$

(14)  $2.\square \times 1.\square = 2.02$

(15)  $1.\square \times 1.\square = 2.01$

explain why

(16)  $1.2 \times 1.25 = 1.5$

(17)  $1.4 \times 1.25 = 1.75$

(18)  $1.5 \times 1.6 = 2.4$

(19)  $1.6 \times 1.75 = 2.8$

find digits to fit in the boxes to make 2

(20) (a)  $1.\square \times 1.\square = 2$

(b)  $2.\square \times 0.\square = 2$

(c)  $1.\square \times 1.\square = 2$

# Decimal Multiplication Targets

use a calculator to find digits to fit in the boxes to make the sum true – not the same digit in each box

(1)  $1.\square \times 1.\square = 2.16$

(2)  $1.\square \times 1.\square = 1.82$

(3)  $1.\square \times 1.\square = 1.87$

(4)  $1.\square \times 1.\square = 1.95$

(5)  $1.\square \times 1.\square = 1.26$

(6)  $1.\square \times 1.\square = 1.47$

(7)  $1.\square \times 1.\square = 1.61$

(8)  $1.\square \times 1.\square = 1.62$

(9)  $1.\square \times 1.\square = 1.68$

(10)  $1.\square \times 1.\square = 2.17$

(11)  $1.\square \times 1.\square = 2.59$

(12)  $1.\square \times 1.\square = 3.12$

(13)  $1.\square\square \times 1.\square\square = 1.11$

(14)  $1.\square\square \times 1.\square\square = 1.4$

(15)  $1.\square\square \times 1.\square\square = 2.24$

(16)  $1.\square\square \times 1.\square\square = 3.01$

(17)  $1.\square\square \times 1.\square\square =$

how many decimal places (after the point) will a calculation like this usually have?

(18)  $1.\square\square\square \times 1.\square\square\square =$

how many decimal places (after the point) will a calculation like this usually have?

# Decimal Division Explorations

## practice makes perfect: decimal division explorations

### i) find 'a' and 'b'

'a' is 3 more than 'b' and

$$a \div b =$$

- (a) 2.5
- (b) 1.6
- (c) 1.5
- (d) 1.4
- (e) 1.3
- (f) 1.2
- (g) 3.5
- (h) 2.25
- (i) 8.5
- (j) 4.75
- (k) 1.06
- (l) 1.04

what whole numbers can result for  $a \div b$  if  $a = 3 + b$ ?

can you obtain a result smaller than 1?

### ii) division by 0.4

find the missing digits (not zero)

(a) find two solutions

$$0.3 \square \div 0.4 = 0.\triangle 5$$

(b) find two solutions

$$2.\square 4 \div 0.4 = 5.\triangle$$

(c) find two solutions

$$3.0 \square \div 0.4 = 7.\triangle$$

(d) find two solutions

$$2.\square 8 \div 0.4 = \triangle.7$$

(e) find two solutions

$$12.\square 4 \div 0.4 = 31.\triangle$$

### iii) equations

find the numbers

(a)

$$7a - (a + 0.7) = 2.3$$

$$9b - (b + 0.9) = 2.3$$

$$13c - (c + 1.3) = 2.3$$

$$25d - (d + 2.5) = 2.3$$

(b)

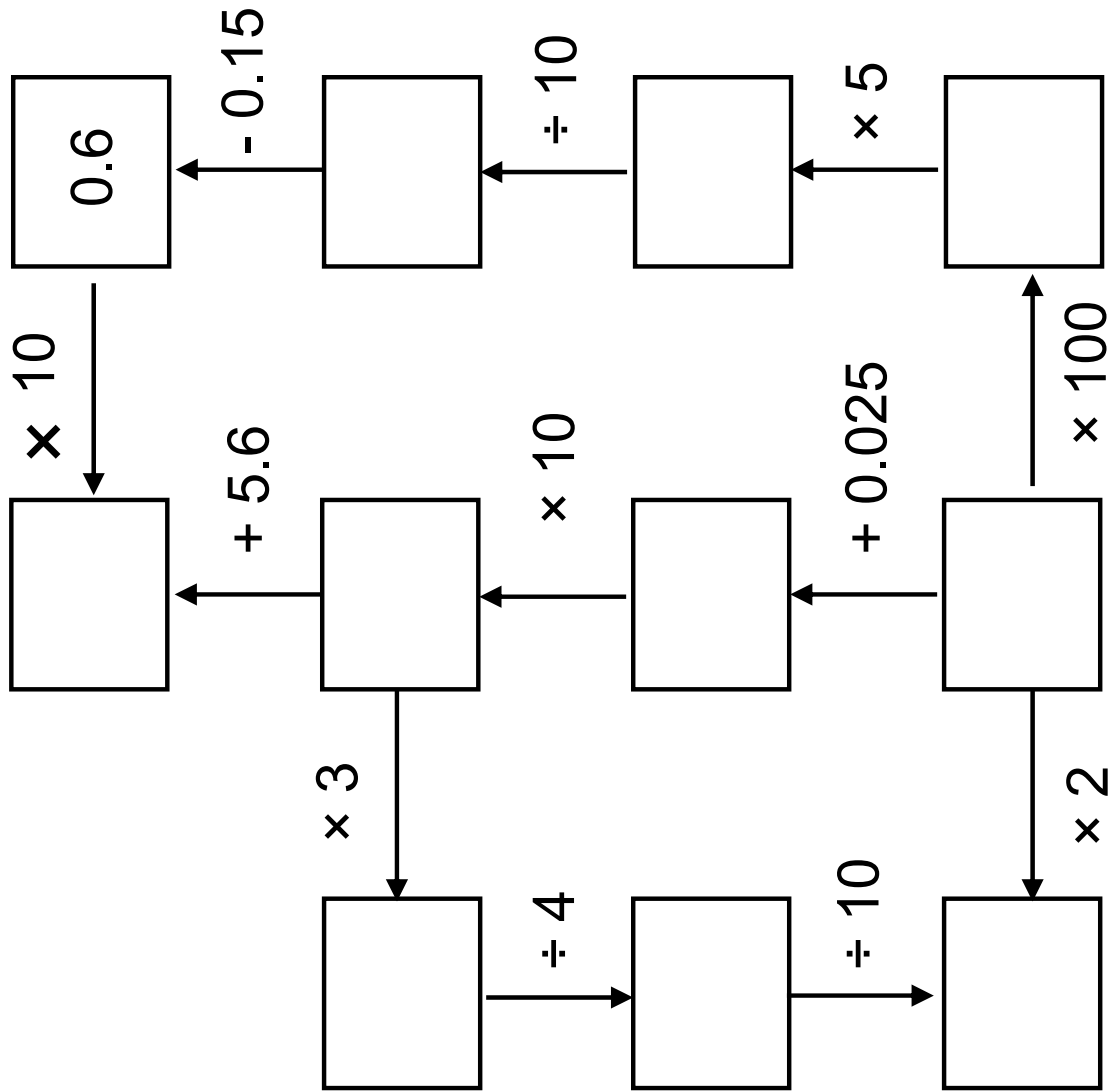
$$10a - (a + 1.0) = 3.5$$

$$13b - (b + 1.3) = 3.5$$

$$19c - (c + 1.9) = 3.5$$

$$37d - (d + 3.7) = 3.5$$

# Decimal Calculations Grid Puzzles



## decimal calculations grid puzzle

Put the numbers below into the empty boxes so that all the statements are true

1.2

0.75

6

7.5

0.015

0.04

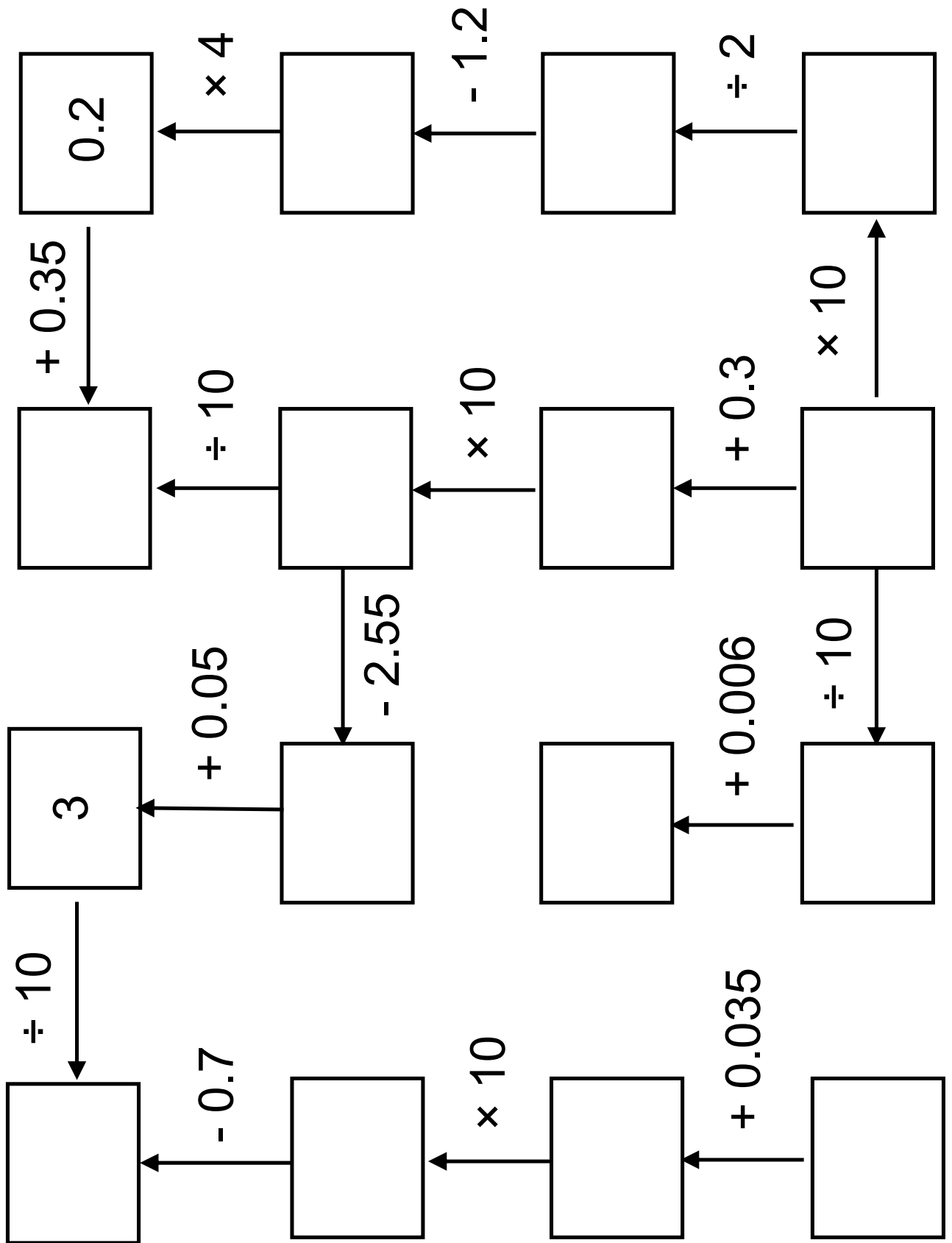
0.03

0.3

1.5

0.4

# Decimal Calculations Grid Puzzles



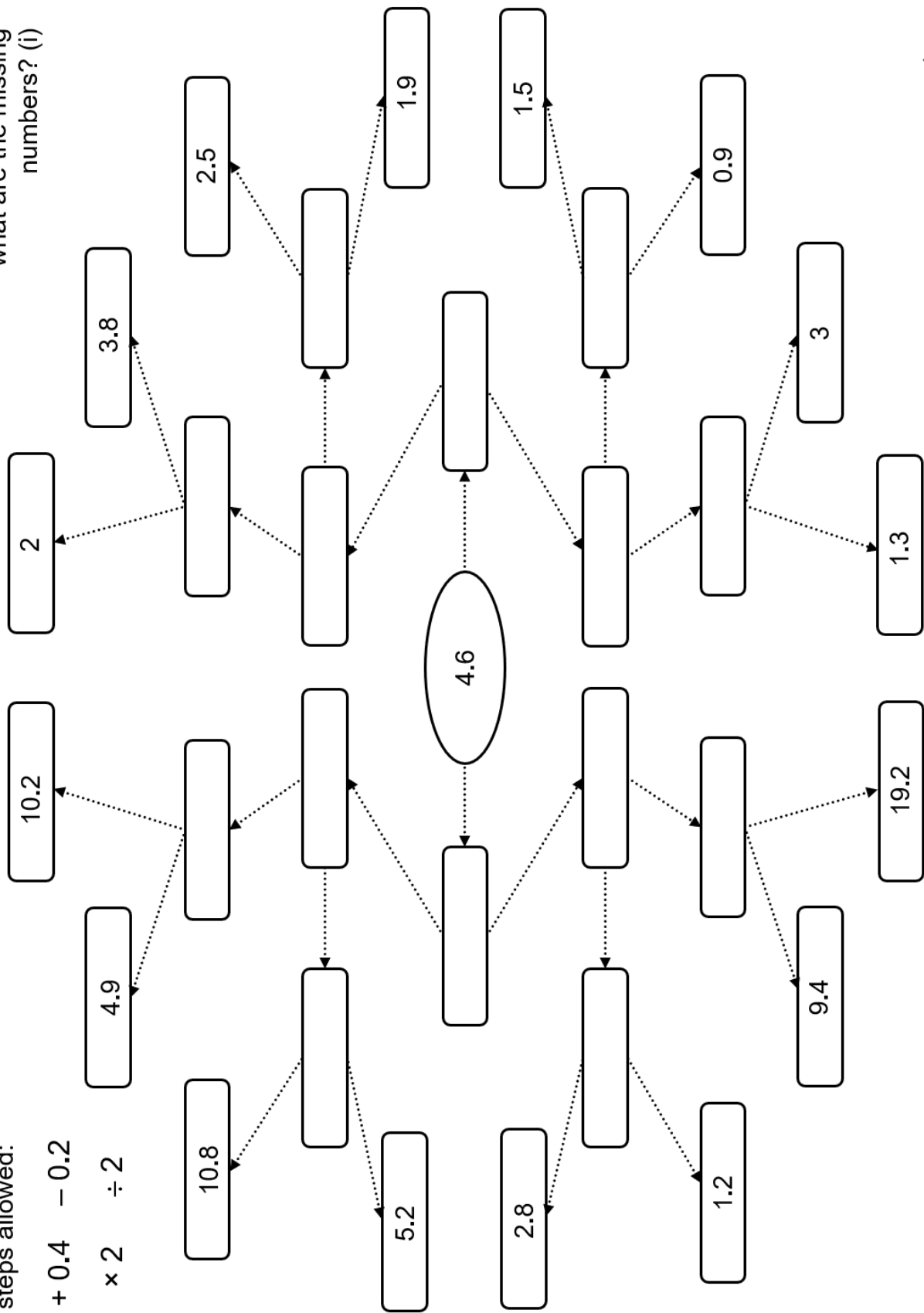
# Radiating Decimals

what are the missing numbers? (i)

steps allowed:

$+ 0.4$     $- 0.2$

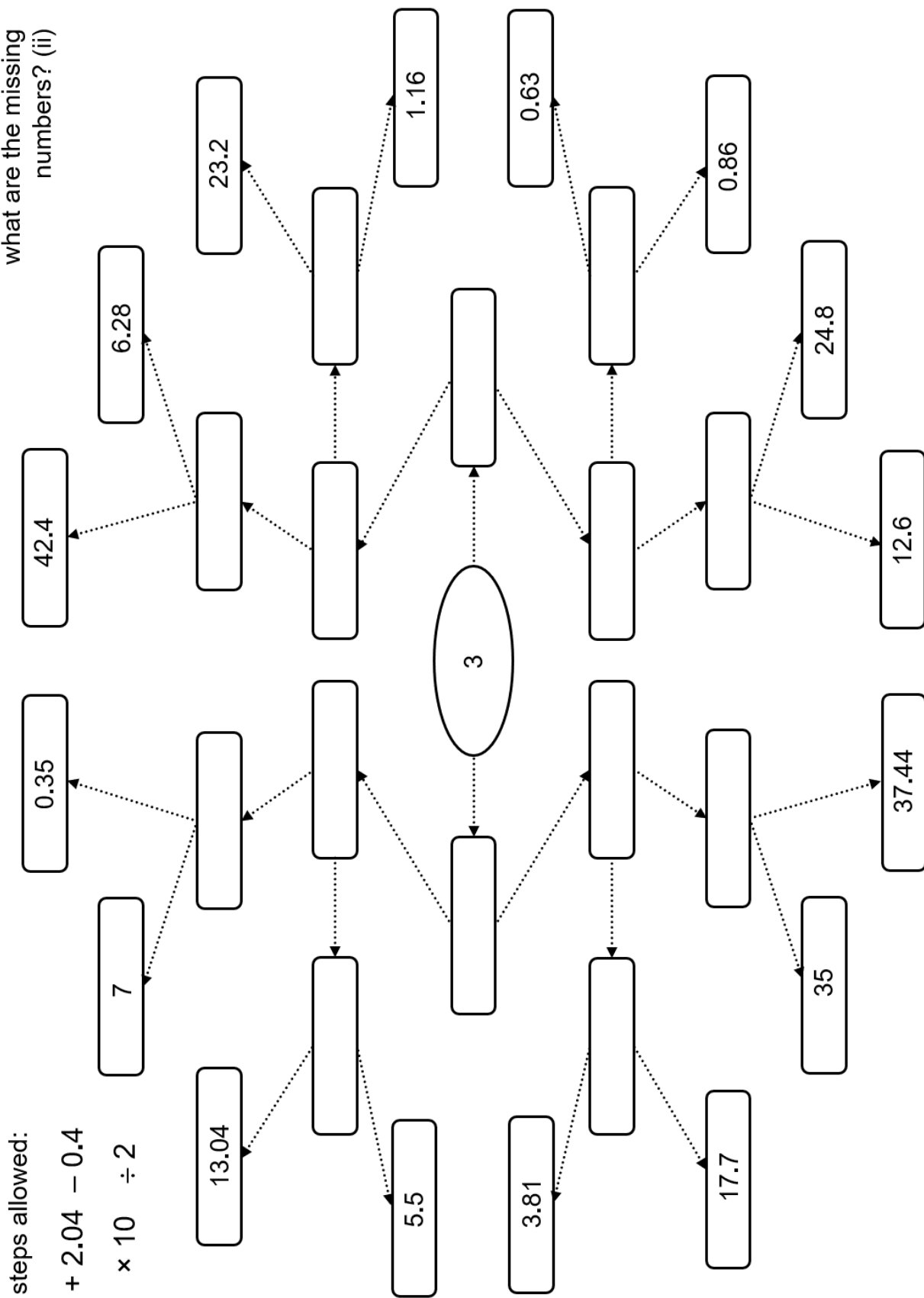
$\times 2$     $\div 2$



no repeats

# Radiating Decimals

what are the missing numbers? (ii)



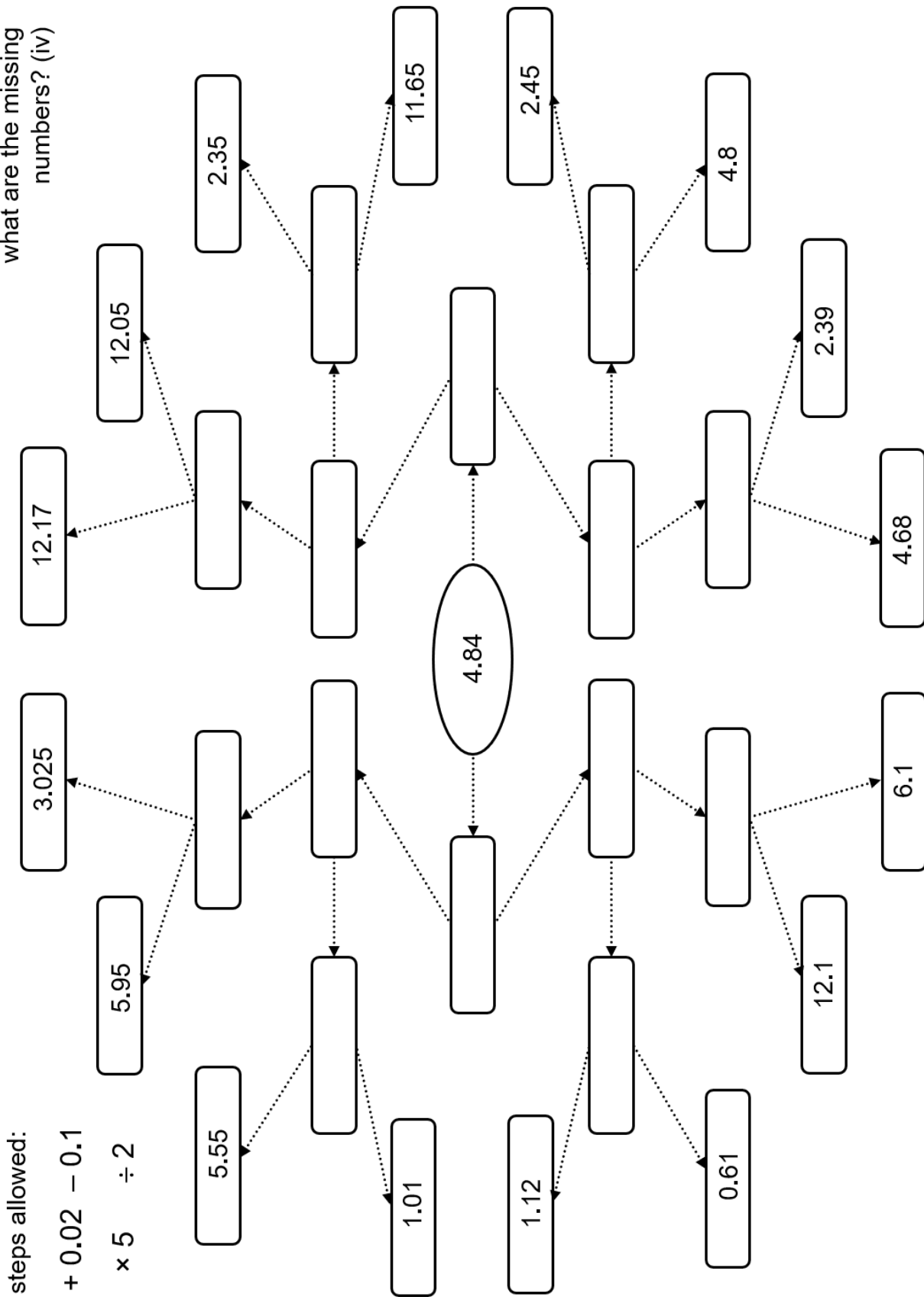
no repeats





# Radiating Decimals

what are the missing numbers? (iv)



no repeats

# 3 Solving Linear Equations

# Fluency Practice

Decide whether the following are an expression, an equation, a formula, or an identity.

$y = mx + c$	$2a + b$	$3(b + 4) = 12$
$\frac{y}{5} = 6$	$abc$	$A = \pi r^2$
$xy = yx$	$2x + 4 = 12$	$x + 2y$
$2a - 5b$	$x + x + x$	$a + bc$
$5x - 6 = 46$	$2x + 4$	$a^2 + b^2 = c^2$
$3(a - 5)$	$C = \pi d$	$2x = x - 5$
$s = \frac{d}{t}$	$2x^2 = 64$	$x + y = y + x$

## Intelligent Practice

Solve the following equations using the balancing method:

1)  $x + 5.3 = 9.5$

10)  $5.6 + x = 9.2$

2)  $8.2 = 7.2 + x$

11)  $5.6 - x = 9.2$

3)  $8.5 = 7.2 + x$

12)  $x - 5.6 = 9.2$

4)  $8.3 = x + 5.5$

13)  $-x - 5.6 = 9.2$

5)  $x - 5.2 = 9.9$

14)  $-5.6 - x = 9.2$

6)  $4.5 - x = 1.2$

15)  $-5.6 + x = 9.2$

7)  $4.5 - x = 6.3$

16)  $-5.6 + x = -9.2$

8)  $x - 6.3 = 1.2$

17)  $-5.6 - x = -9.2$

9)  $x + 5.1 = 8.9$

18)  $-9.2 - x = -5.6$

# Intelligent Practice

Solve the following equations using the balancing method:

1)  $\frac{x}{2.2} = 7$

10)  $-4.1x = -24.19$

2)  $4.1x = 16.81$

11)  $\frac{x}{-4.1} = -24.19$

3)  $5.6x = 12.88$

12)  $\frac{-x}{4.1} = -24.19$

4)  $\frac{x}{1.3} = 9.9$

13)  $-\frac{x}{4.1} = -24.19$

5)  $\frac{x}{2.9} = 7.1$

14)  $-\frac{x}{4.1} = 24.19$

6)  $8.3 = \frac{x}{4.1}$

15)  $-\frac{x}{24.19} = -4.1$

7)  $2.2x = 7.26$

8)  $4.1x = 24.19$

9)  $4.1x = -24.19$

## Fluency Practice

1)  $\frac{x}{45} = 76$

9)  $\frac{x}{-2} = 0.043$

17)  $-1 = -x$

2)  $5x = 918$

10)  $\frac{45}{76} = x - 1$

18)  $-\frac{7}{5} + x = 0.3$

3)  $\frac{4}{7} + x = 3$

11)  $1.2x = 41$

19)  $-0.1 = x - \frac{4}{10}$

4)  $-x = 0.043$

12)  $x - (-3) = 5$

20)  $-1 = -\frac{x}{7.4}$

5)  $x - 52 = -10$

13)  $\frac{x}{3} = -\frac{7}{4}$

21)  $\frac{7}{4}x = -5$

6)  $3 = \frac{4}{7}x$

14)  $-1 = x - 1$

22)  $-\frac{7}{4} + x = -\frac{6}{11}$

7)  $\frac{x}{7.4} = 1000$

15)  $41x = 1.2$

23)  $\frac{7}{4} = x \div 2$

8)  $918 = 5 + x$

16)  $\frac{x}{10} = -\frac{7}{5}$

24)  $\frac{4}{5} = 0.07x$

## Fluency Practice

Solve each equation to find the value of the unknown variable.

$$1) \frac{m}{4} = 8$$

$$2) 3a = 27$$

$$3) t + 4 = 19$$

$$4) v - 7 = 4$$

$$5) 6 + e = 8$$

$$6) 18 = 3h$$

$$7) y - 5 = -7$$

$$8) \frac{1}{3}s = 6$$

$$9) -26 = x + 12$$

$$10) -18 = 2z$$

$$11) \frac{a}{3} = -12$$

$$12) x - 4 = -4$$

$$13) -\frac{d}{5} = 10$$

$$14) -7p = -28$$

$$15) -45 = 28 + w$$

$$16) -6 = -\frac{u}{2}$$

$$17) 5r = 3$$

$$18) \frac{1}{6}f = -8$$

$$19) 15 = 6y$$

$$20) \frac{x}{4} = \frac{1}{3}$$

$$21) g - \frac{3}{5} = \frac{1}{2}$$

$$22) \frac{5}{7} = \frac{m}{3}$$

$$23) 3q = \frac{1}{5}$$

$$24) j + 3 = 4\frac{2}{7}$$

$$25) 1\frac{4}{5} = s - 2\frac{1}{4}$$

$$26) -4b = \frac{2}{3}$$

$$27) 2\frac{3}{4} = \frac{t}{5}$$

$$28) \frac{1}{4}c = \frac{3}{7}$$

$$29) -4x = -\frac{2}{7}$$

$$30) -\frac{h}{4} = 3\frac{1}{3}$$

$$31) -2\frac{1}{5} = 6t$$

$$32) 4.6 = p - 2\frac{4}{9}$$

# Fluency Practice

Solve:

- (a)  $x + 3 = 10$       (b)  $5 + x = 12$   
(c)  $x + 7 = 9$       (d)  $x + 3.5 = 7.5$   
(e)  $1.1 + x = 3$       (f)  $27 = x + 12$   
(g)  $x + 7 = -2$       (h)  $5.5 + x = 12.5$

Solve:

- (a)  $x - 2 = 7$       (b)  $x - 4 = 1$   
(c)  $8 = x - 3$       (d)  $x - 1.2 = 7$   
(e)  $6.5 = x - 1$       (f)  $x - 42 = 73$   
(g)  $x - 3 = -7$       (h)  $8.5 = x - 1.5$

Solve:

- (a)  $2x = 8$       (b)  $6x = 18$   
(c)  $15 = 3x$       (d)  $4x = -20$   
(e)  $2x = 4.8$       (f)  $-45 = 9x$   
(g)  $5x = 3$       (h)  $10x = 7$

Solve:

- (a)  $\frac{x}{3} = 12$       (b)  $\frac{x}{7} = 2$   
(c)  $\frac{x}{5} = -1$       (d)  $13 = \frac{x}{2}$   
(e)  $\frac{x}{8} = -5$       (f)  $\frac{x}{6} = 1.5$   
(g)  $\frac{x}{10} = 0.6$       (h)  $-2 = \frac{x}{6}$

Solve:

- (a)  $x - 8 = 15$       (b)  $x - 2.5 = 7$   
(c)  $2x = 134$       (d)  $0.5x = 4$   
(e)  $x + 3 = 9$       (f)  $x + 0.3 = 1.7$   
(g)  $72 = 6x$       (h)  $x + 6 = 1.5$   
(i)  $\frac{x}{2} = 6$       (j)  $-40 = 5x$



# Intelligent Practice

Form the following expressions starting from  $x$ :

- $2x + 3$

- $\frac{4x+3}{2}$

- $2x - 3$

- $\frac{4x-3}{2}$

- $-2x + 3$

- $2(4x - 3)$

- $3 - 2x$

- $\frac{2(4x-3)}{5}$

- $-3 - 2x$

- $\frac{2(4x-3)}{5} + 6$

- $\frac{x}{2} + 3$

- $\frac{x}{2} - 3$

- $\frac{8\left(\frac{2\left(\frac{4x}{7}-3\right)}{5}+6\right)}{9}$

- $\frac{x-3}{2}$

- $\frac{x+3}{2}$

# Intelligent Practice

Solve the following equations using the balancing method:

1)  $2x + 3 = 22$

10)  $-7 + 4x = -25$

2)  $22 = 2x + 3$

11)  $-7 - 4x = -25$

3)  $2x - 3 = 22$

12)  $-7 - 6x = -25$

4)  $4x - 3 = 22$

13)  $-7 - 6x = -28$

5)  $4x - 7 = 23$

14)  $-6x - 7 = -28$

6)  $7 - 4x = 23$

15)  $6x + 7 = 28$

7)  $7 - 4x = 25$

16)  $6x + 8 = 28$

8)  $7 + 4x = 25$

17)  $3x + 4 = 14$

9)  $7 + 4x = -25$

18)  $3x + 14 = 4$

Which of these equations have had their first step correctly performed?  
Can you identify what mistakes have been made and correct them?

1.	$3x + 2 = 7$	↓ +2
	$3x = 9$	

3.	$3x + 7 = 10$	↓ -7
	$3x = 3$	

5.	$6x + 9 = 11$	↓ -9
	$6x = 3$	

7.	$3x + 11 = 7$	↓ -11
	$3x = -4$	

9.	$5x + 10 = 15$	↓ ÷5
	$x + 2 = 3$	

2.	$5x + 2 = 15$	↓ ÷5
	$x + 2 = 3$	

4.	$2x - 4 = 5$	↓ +4
	$6x = 9$	

6.	$4x + 20 = 15$	↓ ÷4
	$x + 5 = 15$	

8.	$19x - 17 = 51$	↓ +17
	$19x + 17 = 68$	

10.	$3x - 7 = -10$	↓ -7
	$3x - 14 = -17$	

## Fluency Practice

## Fluency Practice

some equations with answers that are not too nice

1)  $4n + 27 = 28$                       6)  $21 + 10n = 36$

2)  $10n - 16 = 17$                       7)  $6n - 5 = 16$

3)  $2n + 6 = 5$                           8)  $7 + 8n = 5$

4)  $4n + 5 = 23$                       9)  $17 + 4n = 3$

5)  $\frac{1}{2}n + 18 = 16$                       10)  $\frac{2}{3}n + 24 = 6$

# Problem Solving

$$\begin{array}{c} \square = 23 \\ \square \quad \square \\ \square \quad \square \quad \square \\ 3x+1 \quad x+1 \quad x+2 \\ x = \end{array}$$

$$\begin{array}{c} \square = 44 \\ \square \quad \square \\ \square \quad \square \quad \square \\ x+5 \quad 2x+1 \quad 2x+2 \\ x = \end{array}$$

$$\begin{array}{c} \square = 31 \\ \square \quad \square \\ \square \quad \square \quad \square \\ 9x+2 \quad x \quad x+5 \\ x = \end{array}$$

$$\begin{array}{c} \square = 61 \\ \square \quad \square \\ \square \quad \square \quad \square \\ x+2 \quad 3x+2 \quad x+7 \\ x = \end{array}$$

$$\begin{array}{c} \square = 65 \\ \square \quad \square \\ \square \quad \square \quad \square \\ \square \quad \square \quad \square \quad \square \\ 2x+1 \quad 2x+8 \quad x+1 \quad x+1 \\ x = \end{array}$$

$$\begin{array}{c} \square = 35 \\ \square \quad \square \\ \square \quad \square \quad \square \\ \square \quad \square \quad \square \quad \square \\ 3 \quad x+1 \quad 2x+3 \quad 2 \\ x = \end{array}$$

$$\begin{array}{c} \square = 69 \\ \square \quad \square \\ \square \quad \square \quad \square \\ \square \quad \square \quad \square \quad \square \\ 4x+1 \quad x+2 \quad x+5 \quad x+3 \\ x = \end{array}$$

$$\begin{array}{c} \square = 90 \\ \square \quad \square \\ \square \quad \square \quad \square \\ \square \quad \square \quad \square \quad \square \\ x+1 \quad x+2 \quad x+1 \quad x+8 \\ x = \end{array}$$

# Problem Solving

$$\begin{array}{c} \square = 27 \\ \square \quad \square \\ \square - 2 \quad 2x - 1 \quad 3x - 1 \end{array}$$

$x =$

$$\begin{array}{c} \square = 16 \\ \square \quad \square \\ 4x + 5 \quad 2x \quad x + 2 \end{array}$$

$x =$

$$\begin{array}{c} \square = 26 \\ \square \quad \square \\ 3x - 1 \quad x - 1 \quad -1 \end{array}$$

$x =$

$$\begin{array}{c} \square = 16 \\ \square \quad \square \\ x - 1 \quad x - 2 \quad 3x + 3 \end{array}$$

$x =$

$$\begin{array}{c} \square = 53 \\ \square \quad \square \\ \square \quad \square \quad \square \\ x + 1 \quad 2x + 1 \quad x + 1 \quad x + 2 \end{array}$$

$x =$

$$\begin{array}{c} \square = 81 \\ \square \quad \square \\ \square \quad \square \quad \square \\ 5x + 1 \quad x - 3 \quad x - 2 \quad x - 1 \end{array}$$

$x =$

$$\begin{array}{c} \square = 24 \\ \square \quad \square \\ \square \quad \square \quad \square \\ 2x - 2 \quad 0 \quad x - 1 \quad 2x - 6 \end{array}$$

$x =$

$$\begin{array}{c} \square = 18 \\ \square \quad \square \\ \square \quad \square \quad \square \\ 2x - 4 \quad -1 \quad 2x - 2 \quad 7 \end{array}$$

$x =$

# Fluency Practice

Question 2: Solve the following equations

(a)  $\frac{x}{4} + 1 = 9$       (b)  $\frac{x}{2} - 5 = 9$       (c)  $\frac{w}{5} + 2 = 3$       (d)  $\frac{x}{8} - 7 = 2$

(e)  $\frac{m}{3} - 4 = 0$       (f)  $\frac{x}{6} + 7 = 2$       (g)  $\frac{k}{4} + 5 = -6$       (h)  $\frac{x}{6} - 2 = -8$

Question 3: Solve the following equations

(a)  $\frac{x+1}{2} = 3$       (b)  $\frac{w-4}{3} = 2$       (c)  $\frac{x-2}{7} = 6$       (d)  $\frac{w+9}{4} = 8$

(e)  $\frac{w-25}{3} = -7$       (f)  $\frac{x+2}{4} = -1$       (g)  $\frac{w+20}{8} = -2$       (h)  $\frac{x-9}{4} = -2$

# Intelligent Practice

Solve the following equations using the balancing method:

$$1) \frac{x}{2} + 4 = 41$$

$$10) \frac{x-8}{3} = 43$$

$$2) \frac{x+8}{2} = 41$$

$$11) -\frac{x-8}{3} = 43$$

$$3) \frac{x-8}{2} = 41$$

$$12) \frac{x-8}{3} = -43$$

$$4) \frac{x-8}{3} = 41$$

$$13) \frac{x-16}{6} = -43$$

$$5) \frac{x}{3} - 8 = 41$$

$$14) \frac{x}{6} - 16 = -43$$

$$6) 8 - \frac{x}{3} = 41$$

$$15) \frac{-x}{6} - 16 = -43$$

$$7) 8 - \frac{x}{3} = 43$$

$$16) \frac{x}{-6} - 16 = -43$$

$$8) \frac{8-x}{3} = 43$$

$$17) -\frac{x}{6} - 16 = -43$$

$$9) \frac{8-x}{-3} = 43$$

$$18) -\frac{x}{6} - 20 = -50$$



# Fluency Practice

Question 4: Solve the following equations

(a)  $\frac{2a}{3} = 6$       (b)  $\frac{2x}{5} = 4$       (c)  $\frac{3x}{10} = 6$       (d)  $\frac{7x}{2} = 28$

(e)  $\frac{3x}{4} = 12$       (f)  $\frac{2x}{9} = -8$       (g)  $\frac{3x}{2} = 2$       (h)  $\frac{5x}{14} = 3$

Question 5: Solve the following equations

(a)  $\frac{3x + 5}{2} = 7$       (b)  $\frac{5x - 12}{3} = 11$       (c)  $\frac{4x + 2}{6} = 5$       (d)  $\frac{10x + 3}{4} = 4$

(e)  $\frac{5x - 8}{2} = 10$       (f)  $\frac{8x + 4}{5} = 12.8$       (g)  $\frac{2x + 13}{3} = 1$       (h)  $\frac{3x - 4}{7} = -4$

(i)  $\frac{7x - 12}{3} = -25$       (j)  $\frac{29 - 2x}{3} = 5$       (k)  $\frac{100 - 5x}{3} = 30$       (l)  $\frac{24 - 3x}{12} = 5$

## Intelligent Practice

Solve the following equations using the balancing method:

$$1) \frac{2x}{3} + 4 = 41$$

$$10) \frac{12-6x}{5} = 43$$

$$2) \frac{2x+12}{3} = 41$$

$$11) \frac{12-6x}{9} = 43$$

$$3) \frac{2x-12}{3} = 41$$

$$12) \frac{4-2x}{3} = 43$$

$$4) \frac{2x-12}{5} = 41$$

$$13) \frac{-4-2x}{3} = 43$$

$$5) \frac{2x}{5} - 12 = 41$$

$$14) \frac{-4-2x}{-3} = 43$$

$$6) \frac{2x}{5} - 12 = 42$$

$$15) \frac{4+2x}{3} = 43$$

$$7) 12 - \frac{2x}{5} = 42$$

$$16) -\frac{4+2x}{3} = -43$$

$$8) \frac{12-2x}{5} = 42$$

$$17) -4 + \frac{2x}{3} = -43$$

$$9) \frac{12-6x}{5} = 42$$

$$18) -43 + \frac{2x}{3} = -4$$

# Fluency Practice

Solve these equations.

- (a)  $x + 6 = 11$     (b)  $x + 11 = 6$   
(c)  $8 + x = 15$     (d)  $x + 3.2 = 9.8$   
(e)  $x - 3 = 10$     (f)  $x - 10 = 3$   
(g)  $3 - x = 10$     (h)  $2.3 = 4.5 - x$

Solve these equations.

- (a)  $3x = 15$     (b)  $8x = 64$   
(c)  $2x = 15$     (d)  $-2x = 6$   
(e)  $\frac{x}{2} = 5$     (f)  $\frac{x}{4} = 5$   
(g)  $10 = \frac{x}{3}$     (h)  $\frac{x}{3} = -7.5$

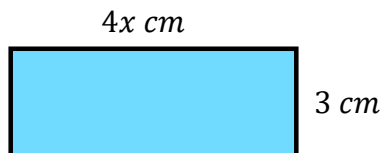
Solve these equations.

- (a)  $2x + 7 = 15$     (b)  $2x - 7 = 15$   
(c)  $7 + 2x = 13$     (d)  $13 + 2x = 7$   
(e)  $2x + 13 = 7$     (f)  $3x + 1 = 10$   
(g)  $3x - 1 = 10$     (h)  $17 = 3x - 1$

Solve these equations.

- (a)  $6 - 2x = 14$     (b)  $20 = 2 - 6x$   
(c)  $8 - 3x = 2$     (d)  $7 - x = 10$   
(e)  $13 - 5x = 3$     (f)  $6 = 5 - 2x$   
(g)  $9.5 = 2 - 3x$     (h)  $6.3 - x = 8.9$

- (a) The perimeter of this rectangle is  $42 \text{ cm}$ . Find its area.



- (b) The area of a triangle is  $75 \text{ cm}^2$ . If its base is  $3x \text{ cm}$  and its height is  $20 \text{ cm}$ , find the value of  $x$ .

# Fluency Practice

Solve:

- (a)  $2x + 3 = 15$  (b)  $3x - 7 = 11$   
(c)  $7 + 5x = 27$  (d)  $4x + 1.5 = 4.5$   
(e)  $3x + 10 = 1$  (f)  $5 = 2x - 9$   
(g)  $7x + 7 = 0$  (h)  $4x - 1 = 6$   
(i)  $5 + 2x = 8$  (j)  $6x - 0.5 = 2.5$

Solve:

- (a)  $\frac{x}{2} + 1 = 5$  (b)  $\frac{x}{3} - 2 = 13$   
(c)  $6 + \frac{x}{2} = 18$  (d)  $\frac{x}{5} + 2.4 = 3.6$   
(e)  $\frac{x}{3} + 9 = 3$  (f)  $\frac{x}{4} - 1 = 0$   
(g)  $6 = \frac{x}{7} - 8$  (h)  $\frac{x}{2} - 5 = 1.5$   
(i)  $2.5 + \frac{x}{5} = 3$  (j)  $2 + \frac{x}{3} = -1$

Solve:

- (a)  $\frac{x+3}{2} = 5$  (b)  $\frac{x-2}{7} = 1$   
(c)  $4 = \frac{x+1}{3}$  (d)  $\frac{x-5}{2} = -2$   
(e)  $\frac{x+2}{5} = 1.5$  (f)  $\frac{x+0.5}{4} = 3$   
(g)  $7 = \frac{x-10}{3}$  (h)  $\frac{x+9}{4} = 2$   
(i)  $\frac{x-3}{9} = 0.5$  (j)  $-2.5 = \frac{x-2}{3}$

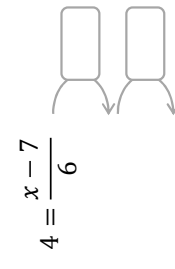
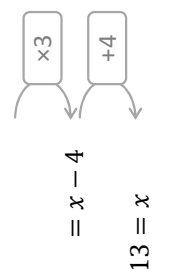
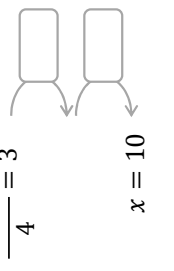
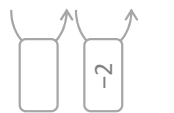
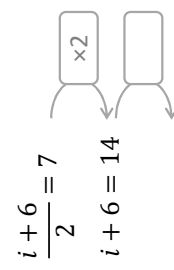
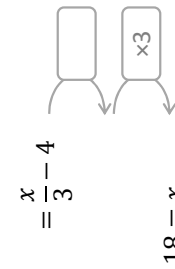
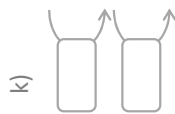
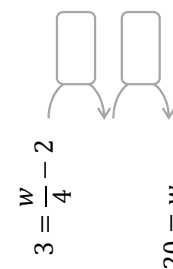
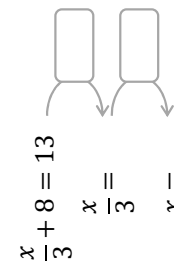
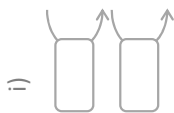
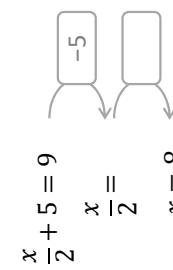
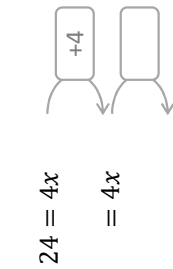
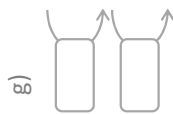
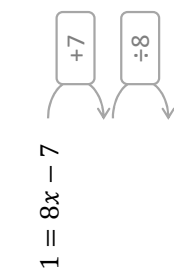
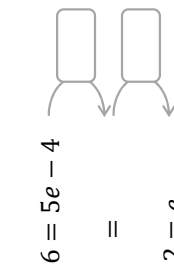
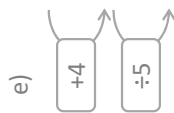
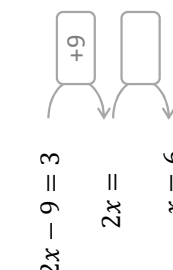
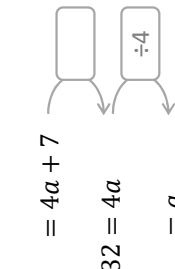
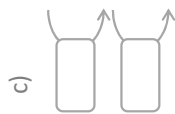
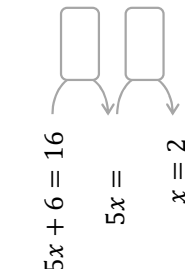
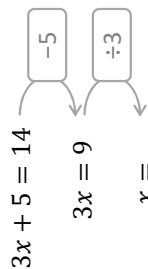
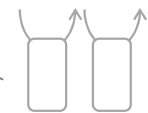
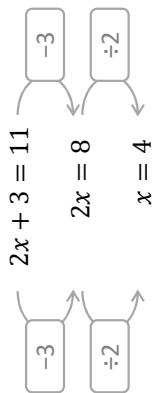
Solve:

- (a)  $\frac{x+4}{8} = 0.2$  (b)  $2.5x - 1 = 14$   
(c)  $\frac{x}{2} - 6 = -0.6$  (d)  $3 = 2x + 3$   
(e)  $5 + \frac{x}{2} = -1$  (f)  $-20 = \frac{x+7}{3}$   
(g)  $3x - 4 = 1$  (h)  $\frac{x}{3} - 2 = \frac{1}{4}$   
(i)  $8 + \frac{x}{2} = 0$  (j)  $5 = 9 - 2x$

# Fluency Practice

## UP & DOWN Equations

Example



Complete the missing information for each method.

# Fluency Practice

## UP & DOWN Equations

Example

$$\frac{3x + 8}{2} = 10$$

$$3x + 8 = 20$$

$$3x = 12$$

$$x = 4$$

$\boxed{\times 2}$

$\boxed{- 8}$

$\boxed{\div 3}$

$\boxed{\times 2}$

$\boxed{- 8}$

$\boxed{\div 3}$

d)

$\boxed{\times 8}$

$\boxed{\phantom{\times}}$

$\boxed{\div 3}$

$\boxed{\phantom{\times}}$

$\boxed{+ 4}$

$\boxed{\phantom{\times}}$

$4 = x$

h)

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$\frac{3i - 9}{4} = 3$$

Complete the missing information for each method.

a)  $\boxed{\phantom{\times}}$   $\boxed{\phantom{\times}}$   $\boxed{\phantom{\times}}$

$$\frac{4x + 1}{3} = 7$$

$$4x + 1 = 21$$

$$4x = 20$$

$$x = 5$$

b)  $\boxed{\phantom{\times}}$   $\boxed{\phantom{\times}}$   $\boxed{\phantom{\times}}$

$$\frac{3x + 4}{5} = 5$$

$\boxed{\times 5}$

$\boxed{- 4}$

$\boxed{\div 3}$

$$3x = 21$$

$$x = 7$$

c)

$\boxed{\times 3}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$24 = 2e + 6$$

$$18 = 2e$$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

e)

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\div 7}$

$$\frac{7b - 2}{2} =$$

$$= 42$$

$\boxed{\phantom{\times}}$

$\boxed{+ 2}$

$\boxed{\phantom{\times}}$

i)

$\boxed{\times 3}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$2 = \frac{4x + 14}{}$$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

f)

$\boxed{\phantom{\times}}$

$\boxed{\times 3}$

$\boxed{\phantom{\times}}$

$$\frac{2x}{3} + 7 = 15$$

$$\frac{2x}{3} = 8$$

$$2x = 24$$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

g)

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$\frac{7x}{2} - 3 = 25$$

$$= 28$$

$$= 56$$

$$x = 8$$

$\boxed{+ 3}$

$\boxed{\times 2}$

$\boxed{\div 7}$

j)

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$= \frac{6x}{5} - 9$$

$\boxed{+ 9}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$15 = 6x$$

k)

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$$-2 = \frac{3k - 13}{7}$$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

$\boxed{\phantom{\times}}$

What would be your first step to solve these equations?

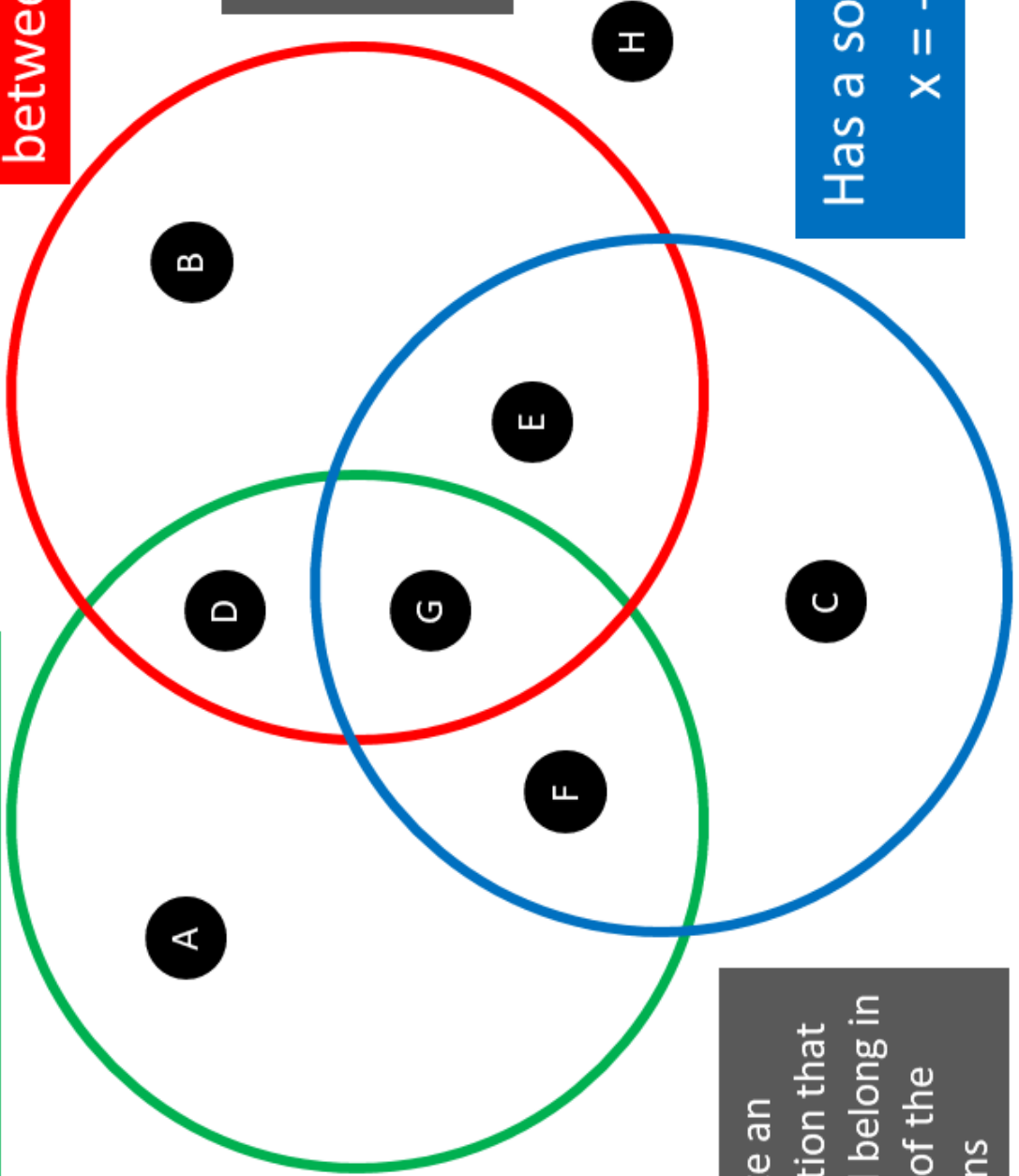
$3x = \frac{8x + 4}{3}$

$7 = 19 - \frac{2x}{3}$

# Maths Venns

Equation is of the form  
..... = 3

All numbers in  
the equation are  
between 3 and -3



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

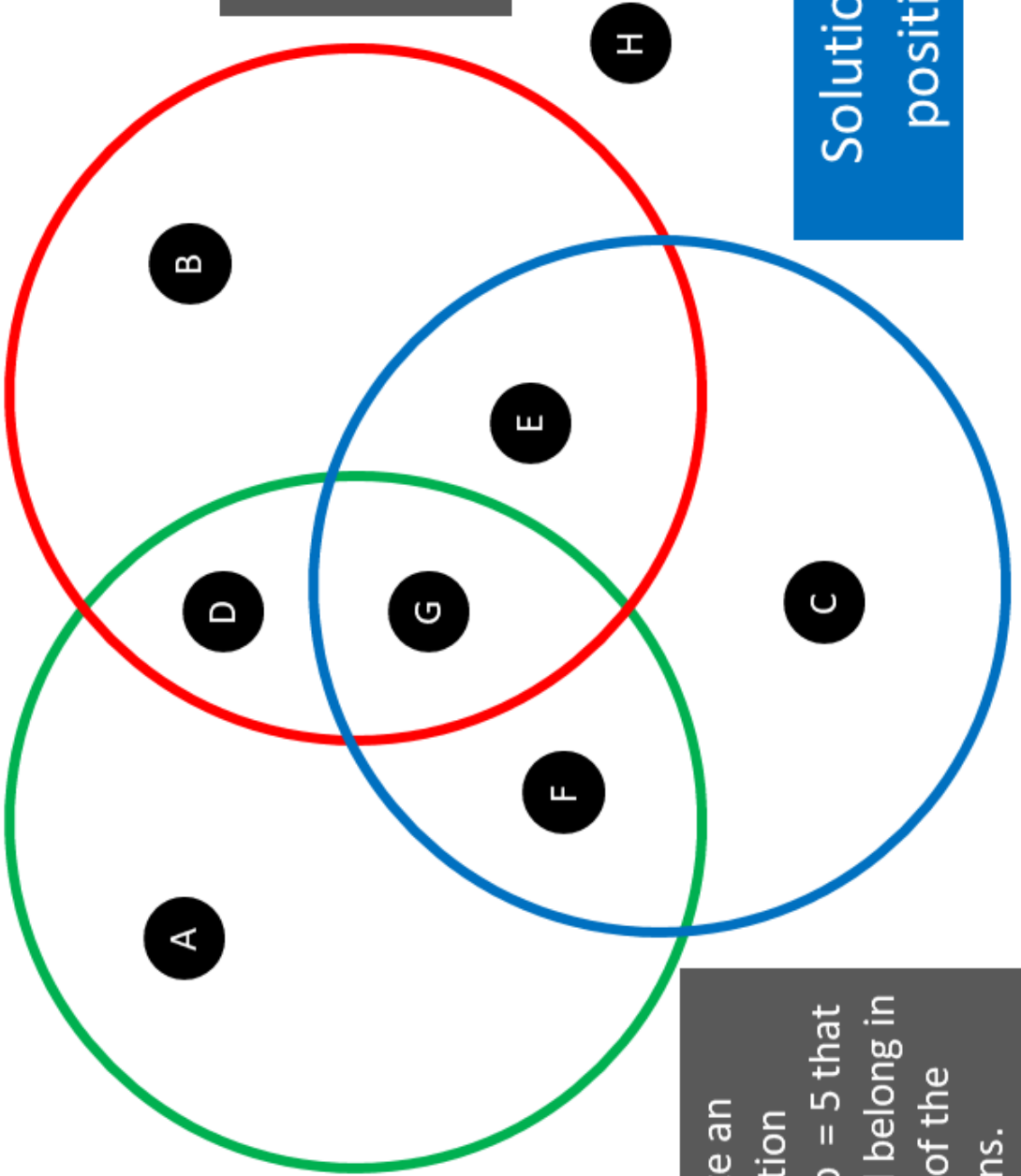
Has a solution  
 $x = -9$

Create an  
equation that  
could belong in  
each of the  
regions

# Maths Venns

Solution is an integer

$a \leq b$



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

Solution is positive

Create an equation  $ax + b = 5$  that could belong in each of the regions.



# More-Same-Less – Linear Equations

Instructions: Work out the value of  $x$  for the given equation. **Create and solve equations** for each of the boxes which satisfy the conditions and have **integer** solutions. Try and make your equations as **similar** as possible to the one in the middle box.

Coefficient of  $x$

	Less	Same	More
Less			
Same		$4x + 53 = 149$	
More			

Value of  $x$