# Contents

This tells you which page you need.

The first page of a lesson is a maths problem. Don't look at the next page until you have had a go! The third and fourth pages give you practice, so you can check your understanding.

# Calculating area

## Discover



$\square$ = 10 m²

**I**
a) What is the actual area of the Top Secret HQ?

b) The Hidden Vault is rectangular. What is its actual area?

## Share

a) The map is drawn to **scale**.

I square on the map has an area of 10 square metres in real life.

$\square$ = 10 m²

A **square metre** is the area of a 1 m × 1 m square. Square metres are written as **m²**.

You can count that there are 27 squares in the rectangle.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |

I will multiply to find the total area.

$27 \times 10 = 270$

The actual area of the Top Secret HQ is 270 m².

b) The length of the vault is 5 squares

The width of the vault is 3 squares.

There are 15 squares in total.

I know the Hidden Vault is rectangular, so I can predict what the complete shape looks like!

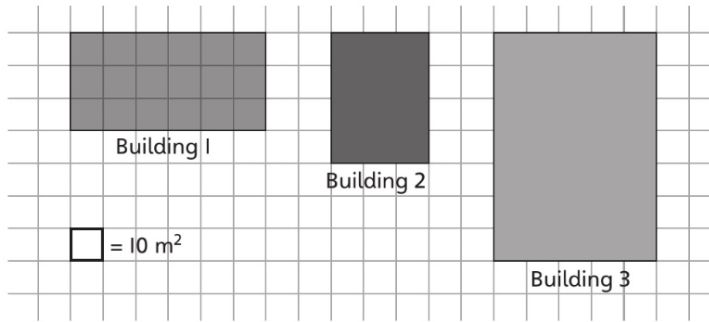$15 \times 10 = 150$

The actual area of the Hidden Vault is 150 m².

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 |

# Calculating area

**1** This map shows the location of three top secret buildings.

They are all rectangles and are drawn to the same scale.

Complete the calculations to show the actual area of each building.



Building 1

Building 2

$\square$ = 10 m²

Building 3

a) Building 1

The area of the building on the map is made up of $\boxed{\phantom{0}}$ squares.

Each square is worth $\boxed{\phantom{0}}$ square metres.

$\boxed{\phantom{0}}$ squares × $\boxed{\phantom{0}}$ m² = $\boxed{\phantom{0}}$ m²

b) Building 2

$\boxed{\phantom{0}}$ squares × $\boxed{\phantom{0}}$ m² = $\boxed{\phantom{0}}$ m²

c) Building 3

$\boxed{\phantom{0}}$ squares × $\boxed{\phantom{0}}$ m² = $\boxed{\phantom{0}}$ m²

**2** These rectangles all have different scales.

Calculate the areas and then order the shapes from smallest to largest area.

A = $\boxed{\phantom{0}}$ × $\boxed{\phantom{0}}$ = $\boxed{\phantom{0}}$ m²

B = $\boxed{\phantom{0}}$ × $\boxed{\phantom{0}}$ = $\boxed{\phantom{0}}$ m²

C = $\boxed{\phantom{0}}$ × $\boxed{\phantom{0}}$ = $\boxed{\phantom{0}}$ m²

Smallest                     Largest

$\boxed{\phantom{0}}$     $\boxed{\phantom{0}}$     $\boxed{\phantom{0}}$



A          B

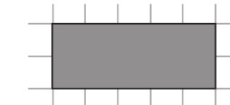$\square$ = 3 m²

$\square$ = 5 m²

C

$\square$ = 2 m²
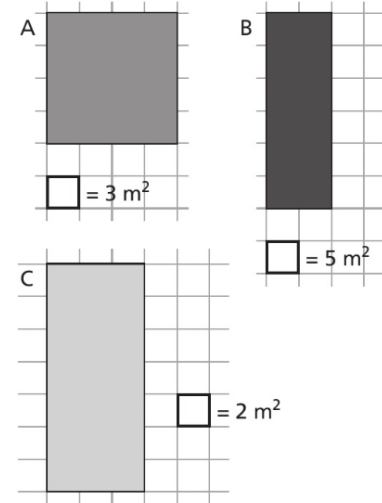
**3** a) Draw a rectangle with an area of 8 squares.

b) Complete the table based on your drawing.

| If 1 square is equal to … | the actual area is … |
|---|---|
| 1 cm² | cm² |
| 1 m² | |
| 4 cm² | |
| | 72 m² |
| | 200 cm² |



**4** This rectangle has an area of 90 cm².

Explain how you know what each square is worth.



_____

_____

# Equivalent fractions

## Discover



We have been asked to design coloured flags.

Reena  Richard  Luis  Emma
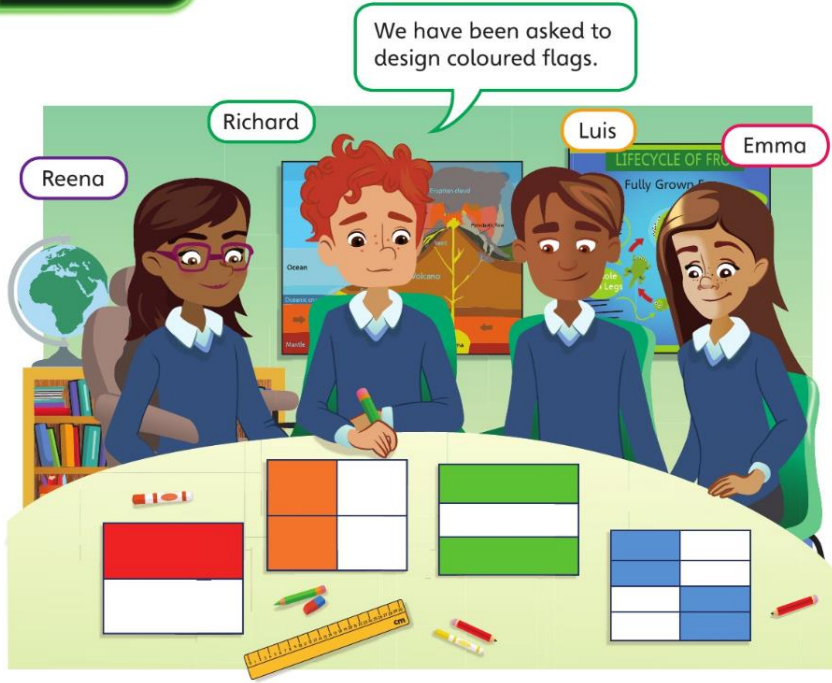
**1** a) Which fractions are equivalent?

b) Which fraction is the odd one out? Create two different fractions that are equivalent to the odd one out.

## Share

a)



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

Multiply the numerators and denominators.

You can also divide to find equivalent fractions.

$$\frac{1}{2} = \frac{2}{4}$$ (× 2)

$$\frac{2}{4} = \frac{4}{8}$$ (÷ 2)

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

The equivalent fractions are $\frac{1}{2}$, $\frac{2}{4}$ and $\frac{4}{8}$.

b) The fraction shown on Luis's flag is the odd one out.

$\frac{2}{3}$ is not equivalent to the others.

I doubled the numerator and the denominator to find an equivalent fraction.

You do not always have to double to find equivalent fractions. I wonder how many other equivalent fractions I can find.

$$\frac{2}{3} = \frac{4}{6}$$ (× 2)

$$\frac{2}{3} = \frac{6}{9}$$ (× 3)

Two fractions equivalent to $\frac{2}{3}$ are $\frac{4}{6}$ and $\frac{6}{9}$.

# Equivalent fractions

**1 a)** Complete the equivalent fractions to match each diagram.
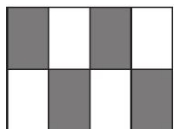
$$\frac{1}{2} = \frac{\boxed{\phantom{0}}}{8} \qquad \frac{1}{2} = \frac{3}{\boxed{\phantom{0}}} \qquad \frac{1}{2} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}}$$
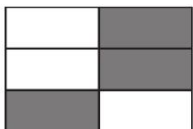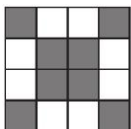
**b)** Draw lines on each diagram to show different fractions equivalent to $\frac{2}{3}$.
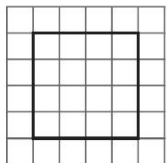
$$\frac{2}{3} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}} \qquad \frac{2}{3} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}} \qquad \frac{2}{3} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}}$$

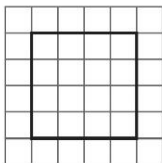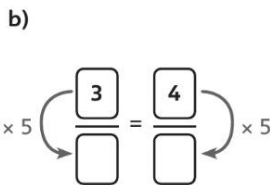**c)** Shade the diagrams to match each fraction.
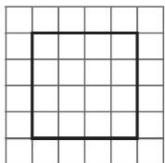
$$\frac{1}{4} \qquad \frac{2}{8} \qquad \frac{3}{12}$$

**2** Complete the equivalent fractions.

**a)** $\times 3$
$$\frac{1}{5} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}}$$
$\times 3$

**c)** $\div 2$
$$\frac{\boxed{\phantom{0}}}{16} = \frac{5}{\boxed{\phantom{0}}}$$
$\div 2$

**e)** $\div 10 \quad \frac{\boxed{\phantom{0}}}{10} = \frac{\boxed{\phantom{0}}}{30} \quad \div 10$

**b)** $\times 5 \quad \frac{3}{\boxed{\phantom{0}}} = \frac{4}{\boxed{\phantom{0}}} \quad \times 5$

**d)** $\times 3$
$$\frac{3}{5} = \frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}}$$
$\times 3$

**f)** $\div 3$
$$\frac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}} = \frac{9}{30}$$
$\div 3$
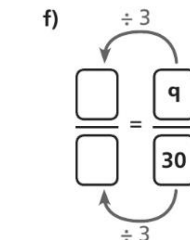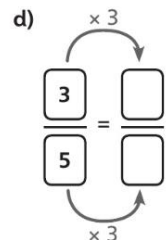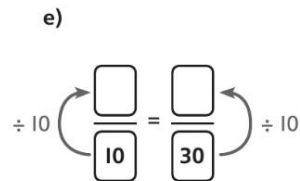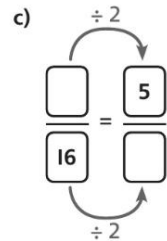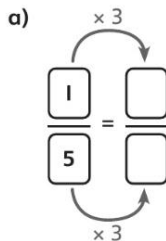
**3** Complete the different equivalent fractions for each fraction shown.

**a)** $\dfrac{80}{240} = \dfrac{8}{\boxed{\phantom{0}}} = \dfrac{\boxed{\phantom{0}}}{6} = \dfrac{200}{\boxed{\phantom{0}}}$

**b)** $\dfrac{3}{12} = \dfrac{6}{\boxed{\phantom{0}}} = \dfrac{\boxed{\phantom{0}}}{32} = \dfrac{\boxed{\phantom{0}}}{\boxed{\phantom{0}}}$

**4** Ambika says, '$\frac{3}{5} = \frac{7}{9}$ because the denominator is always two more than the numerator.'

Is she correct? Use calculations or arrays to show your reasoning.

# Converting improper fractions to mixed numbers

## Discover



I'm painting Lee's room blue.

Sofia

I a) Each can holds $\frac{1}{2}$ litre of paint. How much paint does Sofia have in total?

b) Sofia buys another $\frac{1}{2}$ l can of paint. How much paint does she have now?

## Share

a)
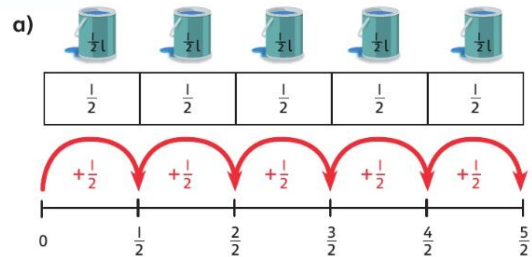


There are 5 half litres of paint.

5 halves is $\frac{5}{2}$. Sofia has $\frac{5}{2}$ litres of paint.

Two half litres make one whole litre.

$\frac{2}{2}$ is equivalent to I.

$\frac{5}{2}$ is an **improper fraction**. The numerator is larger than the denominator.



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

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

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

Sofia has $2\frac{1}{2}$ litres of paint.

# Converting improper fractions to mixed numbers

**1** **a)** Each weight has a mass of $\frac{1}{2}$ kg. Write the total mass of the weights as a mixed number.
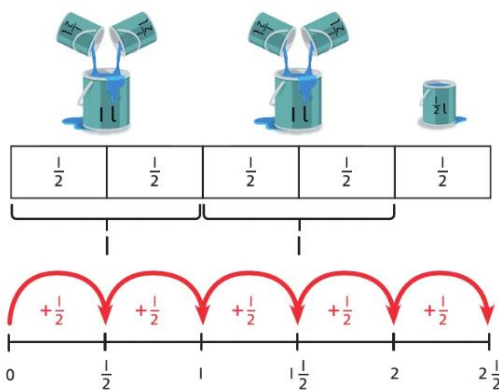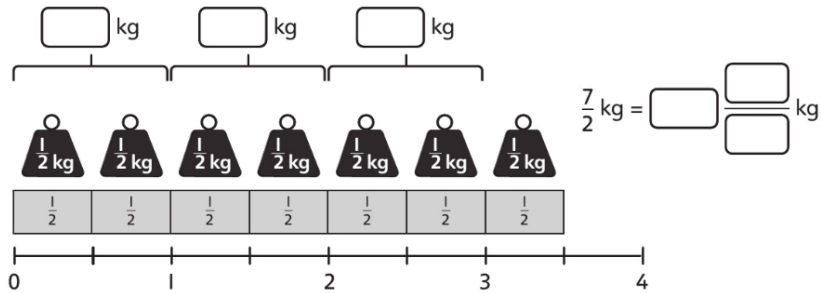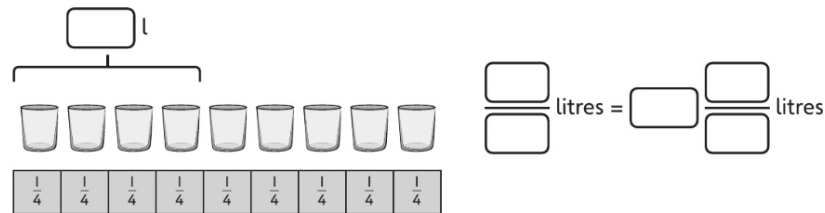
[ ] kg    [ ] kg    [ ] kg

$\frac{1}{2}$ kg $\frac{1}{2}$ kg $\frac{1}{2}$ kg $\frac{1}{2}$ kg $\frac{1}{2}$ kg $\frac{1}{2}$ kg $\frac{1}{2}$ kg

$\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$

0   1   2   3   4

$\frac{7}{2}$ kg = [ ] [ ]/[ ] kg

**b)** Each glass holds $\frac{1}{4}$ litre of juice. Write the total volume of juice as a mixed number.

[ ] l

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

[ ]/[ ] litres = [ ] [ ]/[ ] litres

**c)** Aki has $\frac{11}{3}$ metres of ribbon. Write this as a mixed number.

$\frac{1}{3}$

$\frac{11}{3}$ = [ ] [ ]/[ ]

**2** Max has 15 quarter circles. He joins them together to make whole circles. Complete the statements.

[ ] quarters make one whole circle.

Max has $\underline{15}$ circles in total. That is [ ] [ ]/[ ] whole circles.

**3** Convert these improper fractions to mixed numbers.

**a)** $\frac{13}{3}$ = [ ] [ ]/[ ]

**b)** $\frac{13}{4}$ = [ ] [ ]/[ ]

**c)** $\frac{13}{5}$ = [ ] [ ]/[ ]

**d)** $\frac{14}{5}$ = [ ] [ ]/[ ]

**e)** $\frac{15}{5}$ = [ ]

**f)** $\frac{16}{5}$ = [ ] [ ]/[ ]

**4** Write these improper fractions as mixed numbers in different ways.

**a)** $\frac{14}{4}$ = [ ] [ ]/4 = [ ] [ ]/2

**b)** $\frac{27}{6}$ = [ ] [ ]/6 = [ ] [ ]/[ ]

**c)** $\frac{40}{12}$ = _____

# Comparing and ordering fractions

## Discover

The school library conducts a survey before ordering new books to see what type of books children like. The poster shows the results.

| Type of book | Science fiction | Non-fiction | Mystery fiction | Comic |
|---|---|---|---|---|
| Fraction of children who like this type | $\frac{5}{8}$ | $\frac{3}{5}$ | $\frac{3}{8}$ | $\frac{3}{4}$ |

Amelia    Jamie    Ebo    Reena    Aki

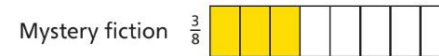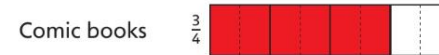**I** **a)** Do more children like science fiction or mystery fiction?
Do more children like science fiction or comic books?

**b)** Do more children like non-fiction or mystery fiction?

## Share

**a)**

Science fiction    $\frac{5}{8}$

Mystery fiction    $\frac{3}{8}$

More children like science fiction than mystery fiction.

5 equal parts are greater than 3 equal parts.

This is easy to compare because the denominators are the same.

Science fiction    $\frac{5}{8}$

Comic books    $\frac{3}{4}$

$\frac{6}{8} > \frac{5}{8}$, so $\frac{3}{4} > \frac{5}{8}$.

More children like comic books than science fiction.

The denominators are not the same. I will use equivalent fractions so I can compare more easily: $\frac{3}{4} = \frac{6}{8}$.

**b)** Each fraction has the same number of parts, but the parts are different sizes.

Non-fiction    $\frac{3}{5}$

Mystery fiction    $\frac{3}{8}$

3 larger parts are greater than 3 smaller parts.

$\frac{3}{5} > \frac{3}{8}$
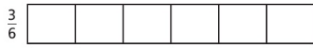
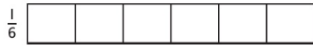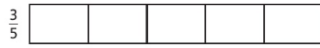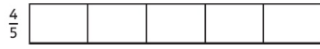More children like non-fiction than like mystery fiction.

# Comparing and ordering fractions

**1** Compare these fractions by completing the diagrams.

**a)** $\frac{1}{6} \bigcirc \frac{3}{6}$

$\frac{1}{6}$ [diagram]

$\frac{3}{6}$ [diagram]

**c)** $\frac{4}{5} \bigcirc \frac{3}{5}$

$\frac{4}{5}$ [diagram]

$\frac{3}{5}$ [diagram]

**b)** $\frac{2}{3} \bigcirc \frac{2}{6}$

$\frac{2}{3}$ [diagram]

$\frac{2}{6}$ [diagram]

**d)** $\frac{5}{8} \bigcirc \frac{3}{4}$
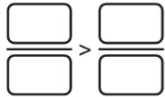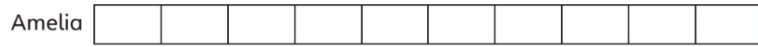
$\frac{5}{8}$ [diagram]

$\frac{3}{4}$ [diagram]
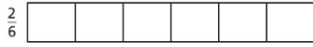
**2** Amelia and Max are running a race.

**a)** Amelia has completed $\frac{3}{10}$ of the track and Max has completed $\frac{2}{5}$. Who has run further?

Amelia [diagram]

Max [diagram]

$\frac{\square}{\square} > \frac{\square}{\square}$

_____ has run further.

**b)** Later, Max has completed $\frac{8}{10}$ and Amelia has completed $\frac{4}{5}$. Is one of them in the lead?

_____

**3** Write each set of fractions in order from largest to smallest.

**a)** $\boxed{\frac{3}{4}}$ $\boxed{\frac{3}{8}}$ $\boxed{\frac{7}{8}}$ $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$

**b)** $\boxed{\frac{1}{2}}$ $\boxed{\frac{5}{6}}$ $\boxed{\frac{5}{12}}$ $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$

**c)** $\boxed{\frac{3}{4}}$ $\boxed{\frac{7}{10}}$ $\boxed{\frac{17}{20}}$ $\boxed{\frac{4}{5}}$ $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$ , $\boxed{\phantom{x}}$

**4** Bella says, 'I used these diagrams to compare $\frac{4}{5}$ and $\frac{6}{10}$. It looks like $\frac{6}{10}$ is bigger.'

$\frac{4}{5}$ [diagram]

Explain her mistake. $\frac{6}{10}$ [diagram]

_____
_____
_____

**5** Use each card once to complete all the statements correctly.

$\boxed{1}$ $\boxed{9}$ $\boxed{12}$ $\boxed{5}$

$\frac{2}{5} > \frac{\square}{15}$ $\qquad$ $\frac{\square}{8} < \frac{1}{4}$ $\qquad$ $\frac{6}{\square} < \frac{3}{4}$ $\qquad$ $\frac{1}{\square} < \frac{5}{18}$