What do you know about fractions?

Look at this picture.

What fraction of the balls are red?



Put these fractions in order, smallest first.

$\frac{1}{2}, \frac{3}{8}, \frac{3}{4}, \frac{5}{16}, \frac{7}{8}, \frac{1}{4}, \frac{7}{16}$

Write down three fractions that are equivalent to

$\frac{3}{5}$

Which is bigger

$1\frac{1}{2}$ or $\frac{7}{5}$?

Write down a fraction that is between

$\frac{1}{2}$ and $\frac{3}{4}$

Calculate

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

$\frac{2}{5} \times 6$

Write as a fraction

0.26

2.48

Calculate

$\frac{2}{3}$ of 18

Rational Numbers

Rational Numbers are numbers that can be written as fractions. **Fractions** are used to describe parts of a whole.



Evie

I know a bit about fractions, we use words like **numerator** and **denominator**...

Yes! We have talked about **adding, subtracting** and **equivalent** fractions



Jon



Alice

I think there are things called **improper** and **cancelling** fractions...



Mr T

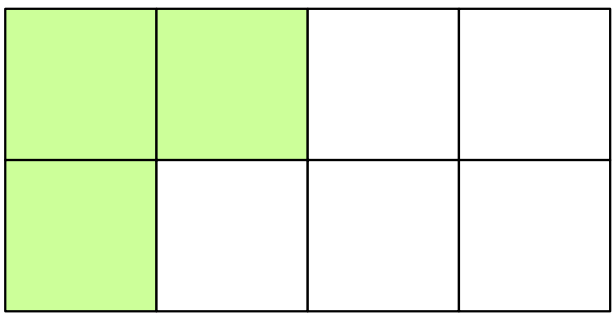
$$\frac{3}{4}$$

The top of the fraction is called the **numerator** and must be an **integer**

The bottom number is called the **denominator** and must also be an **integer.** The denominator can never be zero.

In England, we say this fraction as '3 over 4' or 3 quarters. Other countries have different ways of pronouncing fractions.

1. What fraction of the rectangle below is shaded?



2. What fraction of the rectangle above is not shaded?

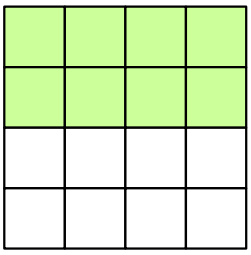
Equivalent fractions

What do you remember about equivalent fractions?

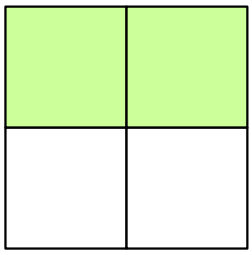


Evie

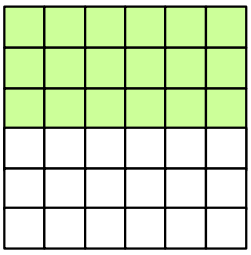
Equivalent fractions are different was of representing the same fraction.
For example the shaded areas ...



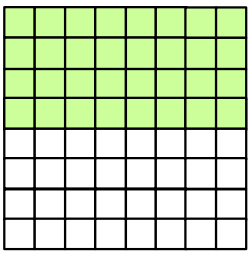
$\frac{8}{16}$



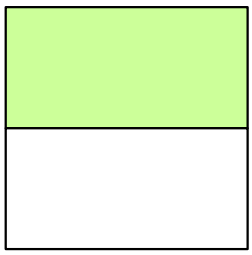
$\frac{2}{4}$



$\frac{18}{36}$



$\frac{32}{64}$



$\frac{1}{2}$

... pictured here are equivalent fractions.



Evie

1 Draw three more fractions that belong to this family

3. Look at this list of fractions.

$\frac{1}{3}, \frac{4}{12}, \frac{3}{8}, \frac{2}{6}, \frac{1}{30}, \frac{15}{30}$

a) Which of the these fractions are equivalent to $\frac{1}{3}$?

b) How did you decide which were equivalent?

c) Write down two more examples for fractions equivalent to $\frac{1}{3}$.



Matthew

Is there an easy way of generating equivalent fractions without actually drawing them?

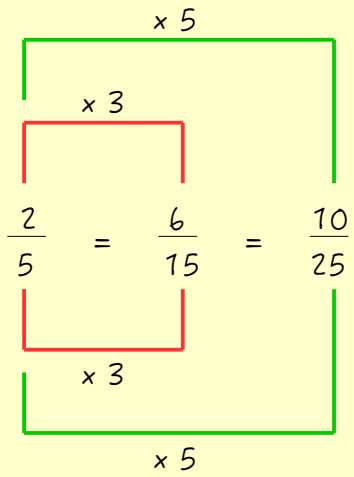
2 How would you answer Matthew's question?



Sarah

Sarah's explanation

The diagram below shows how to generate equivalent fractions.



You just multiply the numerator and the denominator by the same number each time

4. Generate three more fractions that are equivalent to $\frac{2}{5}$.

Bigger than … smaller than ...

We can use a fraction wall to help us to compare the size of a variety of fractions.

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



Amber

We can see that $\frac{1}{4}$ is greater than $\frac{1}{5}$ or $\frac{1}{4} > \frac{1}{5}$

And $\frac{1}{4}$ is less than $\frac{1}{3}$ or $\frac{1}{4} < \frac{1}{3}$



Jon

5. Using the fraction wall, insert the correct symbol between the two given fractions.

a) $\frac{1}{6}$ $\frac{1}{5}$

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

c) $\frac{2}{6}$ $\frac{1}{4}$

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

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

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

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

h) $\frac{5}{6}$ $\frac{3}{4}$

6. Which fraction is bigger $\frac{3}{4}$ or $\frac{5}{8}$?



Evie

To work it out, we could extend the number wall

I think I have a better idea...



Jon

3 What do you think Jon's idea might be?



Matthew

Matthew's explanation

We can use equivalent fractions.

$$\frac{3}{4} = \frac{3 \times 6}{4 \times 6} = \frac{18}{24}$$

$$\frac{5}{8} = \frac{5 \times 3}{8 \times 3} = \frac{15}{24}$$

So $\frac{3}{4} > \frac{5}{8}$

7. Use equivalent fractions to decide which of these fraction is bigger

a) $\frac{4}{5}$ or $\frac{7}{9}$

b) $\frac{5}{6}$ or $\frac{4}{11}$

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

d) $\frac{5}{8}$ or $\frac{7}{12}$



Alice

I've noticed something different about the last question.

4 What do you think Alice noticed?

Ordering fractions



Matthew

Matthew's explanation

We need to find the lowest common denominator of 8 and 12. And that is 24.

$\frac{5}{8} = \frac{15}{24}$ $\frac{7}{12} = \frac{14}{24}$

So $\frac{5}{8} > \frac{7}{12}$



Sarah

I didn't do it like that! I did it the same way as the others.

Sarah's working

$\frac{5}{8} = \frac{5 \times 12}{8 \times 12} = \frac{60}{96}$

$\frac{7}{12} = \frac{7 \times 8}{12 \times 8} = \frac{56}{96}$

So $\frac{5}{8} > \frac{7}{12}$

5 Can you explain the difference between these methods? Which one do you prefer and why?

8. Decide which of these two fractions is smaller in each case. Write your answer as a mathematical statement.

a) $\frac{5}{9}$ or $\frac{7}{12}$

b) $\frac{3}{10}$ or $\frac{4}{15}$

c) $\frac{5}{6}$ or $\frac{7}{8}$

d) $\frac{37}{50}$ or $\frac{59}{75}$

e) $\frac{89}{300}$ or $\frac{117}{400}$

Simplifying Fractions


Amber

If we write fractions in their simplest form, it makes life a lot easier!
For example,

$$\frac{15}{24} = \frac{5 \times \cancel{3}^{1}}{8 \times \cancel{3}_{1}} = \frac{5}{8}$$


Sarah

This is called cancelling! You just look for common factors.

9. Simplify the following fractions by looking for common factors and then cancelling.

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

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

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

d) $\frac{22}{55}$

e) $\frac{270}{300}$



Question creation - Have fun creating problems with complicated fractions for your friends to simplify by cancelling.


Evie

This is my question.
Simplify $\frac{900}{1080}$

And this mine.
Simplify $\frac{2310}{30\,030}$


Jon


Sarah

They are not that hard if you know your division tests!

Adding and Subtracting Fractions



Matthew

It is easy if they have the same denominator!

$$\frac{1}{8} + \frac{5}{8} = \frac{6}{8} = \frac{3}{4}$$

But what if they are not the same?

What about $\frac{2}{5} + \frac{1}{3}$?



Jon



Sarah

I think we should use equivalent fractions again!

6 Can you answer Jon's question using Sarah's idea?



Alice

Alice's working

$$\frac{2}{5} = \frac{6}{15} \qquad \frac{1}{3} = \frac{5}{15}$$

$$\frac{2}{5} + \frac{1}{3} = \frac{6}{15} + \frac{5}{15} = \frac{11}{15}$$

10. Calculate the following...

a) $\frac{1}{6} + \frac{2}{5}$

b) $\frac{7}{12} - \frac{3}{10}$

c) $\frac{3}{10} + \frac{4}{15}$

d) $\frac{11}{21} - \frac{1}{6}$

e) $\frac{5}{6} - \frac{3}{8}$

f) $\frac{17}{30} + \frac{7}{20}$

g) $\frac{19}{22} - \frac{13}{55}$

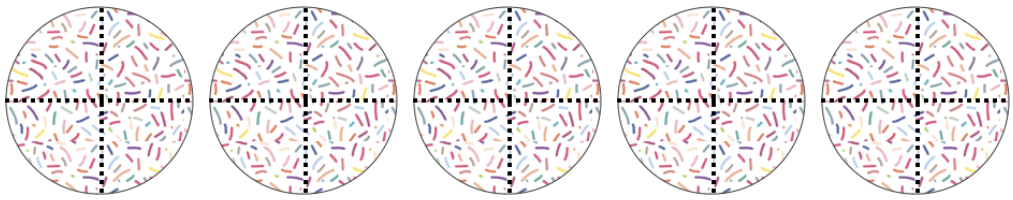
h) $\frac{2}{39} + \frac{9}{26}$

Improper Fractions & Mixed Numbers



Amber

I have five cakes, split into quarters...



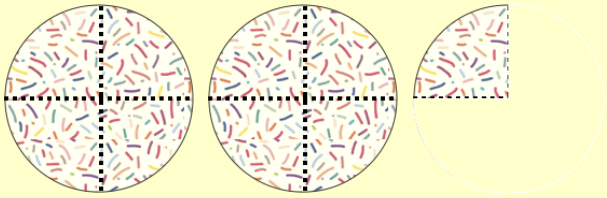
15. Isaac has three pieces, Matthew and Rachel have two pieces each and Amber has four pieces. How much is left? Write this as a fraction sum



Evie

Evie's working

5 whole cakes, that is 20 quarters, between them they ate 11 pieces, that is 11 quarters.
so my sum is $\frac{20}{4} - \frac{11}{4} = \frac{9}{4} = 2\frac{1}{4}$



Converting mixed numbers into improper fractions...

If the numerator is bigger than the denominator, the fraction is called “top heavy” or **an improper fraction**.

Fractions like $2\frac{2}{3}$ are called **mixed numbers**.

It is important that you can convert improper fractions into mixed numbers and vice versa.

16. Convert the following mixed numbers into improper fractions

a) $2\frac{2}{3}$ c) $4\frac{5}{9}$ e) $1\frac{9}{11}$

b) $1\frac{3}{7}$ d) $5\frac{4}{5}$ f) $2\frac{4}{13}$

Working with mixed numbers

17. Convert the following mixed numbers into improper fractions.

a) $\frac{11}{3}$ c) $\frac{14}{9}$ e) $\frac{47}{11}$

b) $\frac{15}{7}$ d) $\frac{22}{5}$ f) $\frac{25}{13}$

18. Calculate

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



Evie

It's easy! Turn them into improper fractions!

$2\frac{3}{4} = \frac{11}{4}$ $\quad 1\frac{2}{3} = \frac{5}{3}$

$2\frac{3}{4} + 1\frac{2}{3} = \frac{11}{4} + \frac{5}{3} = \frac{33}{12} + \frac{20}{12} = \frac{53}{12}$

$\frac{53}{12} = 4\frac{5}{12}$



Jon

I did it slightly differently.

6 What do you think Jon did?

19. Calculate

a) $3\frac{3}{5} + 2\frac{1}{2}$ d) $2\frac{2}{3} + 5\frac{4}{9}$

b) $2\frac{1}{4} + 4\frac{2}{7}$ e) $5\frac{9}{11} + 4\frac{7}{22}$

c) $5\frac{3}{4} + 1\frac{5}{6}$ f) $1\frac{9}{13} + 2\frac{17}{39}$

Working with mixed numbers

20. Calculate

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



Evie

Subtracting is easy too – just turn them into improper fractions again!

I did it differently, I think it is easier...



Sarah

Sarah's method



Sarah

$$3\frac{1}{4} - 1\frac{2}{3} = 1\frac{1}{4} + 2 - 1\frac{2}{3}$$

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

$$= 1 + \frac{3}{12} + \frac{4}{12}$$

$$= 1\frac{7}{12}$$

21. Calculate

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

b) $3\frac{1}{4} - 1\frac{3}{4}$

c) $5\frac{3}{7} - 2\frac{1}{2}$

d) $6\frac{1}{3} - 4\frac{5}{6}$

e) $3\frac{1}{4} - 1\frac{5}{8}$

f) $4\frac{1}{3} - 1\frac{5}{9}$

Multiplying fractions


Evie







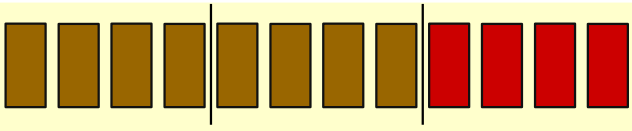

Matthew

Starters – drawing pictures might help!

1. Evie and Matthew have 12 remote controlled vehicles between then. Evie says that $\frac{2}{3}$ of them are "off roaders." How many "off roaders" do they have? Explain how you decided.
2. Sarah has been baking. She made 12 cookies but ate one before Amber and Jon arrived. She wants to share the remaining 11 cookies equally between the three of them. How many cookies should they each get? Explain how you decided?
3. Alice filled 5 glasses with $\frac{2}{3}$ litre of lemonade in each glass. How much lemonade did she use?

Evie's working for Q1.

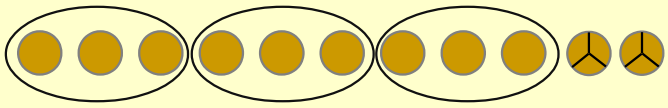

Evie



Divide the 12 vehicles into 3 equal groups of 4.
Two of these groups are "off-roaders" - so
There are 8 "off-roaders".
As a maths sentence I can write this as
$\frac{2}{3}$ of 12 = 8 or $\frac{2}{3} \times 12 = 8$

Sarah's working for Q2.


Sarah



They get $3\frac{2}{3}$ each. Or $11 \div 3 = 3\frac{2}{3}$

Alice's working for Q3.


Alice

$\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{10}{3}$

Or $5 \times \frac{2}{3} = \frac{10}{3}$

Multiplying fractions

In the questions we looked at problems involving multiplying and dividing by fractions.

For example we saw that 5 lots of $\frac{2}{3} = \frac{10}{3}$ and this can be written as $5 \times \frac{2}{3} = \frac{10}{3}$

We also saw that $\frac{2}{3} \times 12 = 8$. Although this looks a bit different, you can use the same idea.

$\frac{2}{3} \times 12 = 12 \times \frac{2}{3} = \frac{\cancel{24}^{8}}{\cancel{3}_{1}} = 8$

You should always simplify your answer by cancelling if you can.

Fitness check

Work out the following. Make sure you write your answer in its simplest form.

1. $6 \times \frac{4}{9}$
2. $8 \times \frac{5}{16}$
3. $9 \times \frac{7}{18}$
4. $\frac{5}{8} \times 7$
5. $\frac{3}{4} \times 12$
6. $\frac{7}{15} \times 5$

Multiplying fractions by fractions

Sarah's mum left $\frac{3}{4}$ of a pizza for Sarah and her two friends to share. What fraction of the whole pizza did they each receive?

Alice's working



Alice



3 people, so each person gets one quarter.

So $\frac{1}{3}$ of $\frac{3}{4} = \frac{1}{4}$ or $\frac{1}{3} \times \frac{3}{4} = \frac{1}{4}$

Matthew divided his birthday cake into 10 pieces and gave one piece to his sister. Over the next few days, he ate $\frac{2}{3}$ of what was left.

7 How much of the cake has Matthew eaten? Write the final calculation as a multiplication sum.

Multiplying fractions

Matthew's working

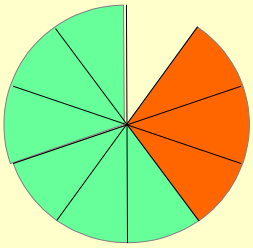


Matthew

One tenth gone, nine tenths left.

$\frac{2}{3}$ of $\frac{9}{10} = \frac{6}{10}$

$\frac{2}{3} \times \frac{9}{10} = \frac{6}{10} = \frac{3}{5}$





Sarah

There must be a quick way of working out questions like this.

8 Can you think of a way to help Sarah out?

Jon's explanation



Jon

It's easy, just multiply the numerators together and multiply the denominators together. Then simplify by cancelling.

$$\frac{2}{3} \times \frac{9}{10} = \frac{2 \times 9}{3 \times 10} = \frac{\cancel{18}^{3}}{\cancel{30}_{5}} = \frac{3}{5}$$

Fitness test

Work out the following. Make sure you write your answer in its simplest form.

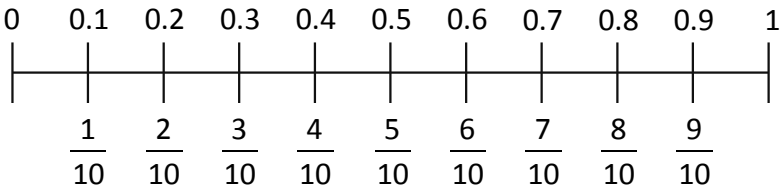
1. $\frac{4}{7} \times \frac{3}{4}$
2. $\frac{2}{5} \times \frac{9}{14}$
3. $\frac{5}{9} \times \frac{3}{10}$
4. $\frac{8}{9} \times \frac{3}{8}$
5. $\frac{6}{7} \times \frac{21}{26}$
6. $\frac{7}{6} \times \frac{3}{14}$

Let's investigate the connection between fractions and decimals

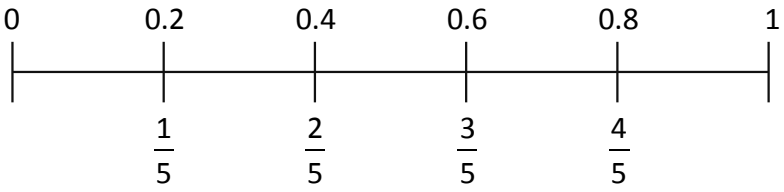
If we share 1L of juice between 10, 5, 2 or 4 people, how much will each person receive?

Write your answer as a fraction and a decimal.

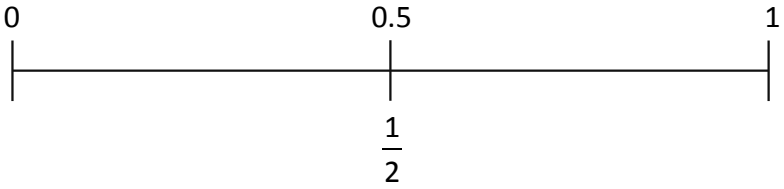
If there are 10 people – each person will receive 0.1L or $\frac{1}{10}$ L.



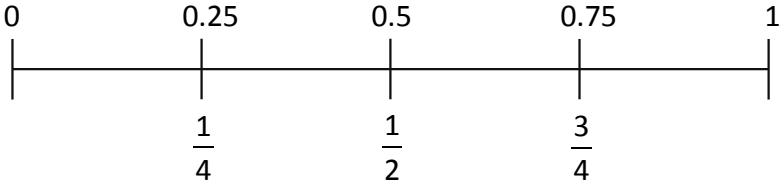
If there are 5 people – each person will receive 0.2L or $\frac{1}{5}$ L.



If there are 2 people – each person will receive 0.5L or $\frac{1}{2}$ L.



If there are 4 people – each person will receive 0.25L or $\frac{1}{4}$ L.



9 What if there are 3 people?

Let's investigate the connection between fractions and decimals

If we share 1L of juice between 3 people, how much will each person receive?

Write your answer as a fraction and a decimal.



Evie

They would get $\frac{1}{3}$ L each.

But how do you write this as a decimal?



Jon

You just treat it as a division sum.



Sarah

Sarah's working

$\frac{1}{3} = 1 \div 3 =$ 0.333...
3 | 1.000
(1, 1, 1)

So $\frac{1}{3} = 0.333\ldots$



Alice

... and it goes on forever.

Use Sarah's method or the drawings on the previous page to find the decimal equivalents of:

1. $\frac{7}{10}$
2. $\frac{3}{4}$
3. $\frac{2}{3}$
4. $\frac{1}{8}$
5. $\frac{3}{5}$
6. $\frac{3}{8}$
7. $\frac{2}{9}$
8. $\frac{4}{11}$
9. $\frac{19}{100}$
10. $\frac{4}{7}$
11. $\frac{4}{3}$
12. $\frac{251}{1000}$

Terminating, non-terminating and recurring decimals


Amber

Amber's working

$\frac{2}{3} = 2 \div 3 = 0.666\ldots$ (3 into 2.000, 1 1 1)

So $\frac{2}{3} = 0.666\ldots$

It goes on forever


Matthew

Matthew's working

$\frac{1}{8} = 1 \div 8 = 0.125$ (8 into 1.000, 1 2 4)

So $\frac{1}{8} = 0.125$

It terminates


Sarah

Sarah's working

$\frac{2}{9} = 2 \div 9 = 0.222\ldots$ (9 into 2.000, 2 2 2)

So $\frac{2}{9} = 0.222\ldots$

It goes on forever


Jon

Jon's working

$\frac{4}{7} = 4 \div 7 = 0.5714285\ldots$ (7 into 4.0000000, 5 7 1 4 2 8 5)

So $\frac{4}{7} = 0.5714285714285\ldots$

It goes on forever

As you have found out, some fractions **terminate** (end) but some do not. These are called **non-terminating** decimals.

For example, $\frac{1}{8}$ is a terminating decimal because it can be written as 0.125.

But $\frac{2}{9}$ is a non-terminating decimal as it goes on forever and can be written as 0.222…

As you can see, some decimals repeat and these are called **repeating decimals**.

We have a special notation to indicate this.

For example, 0.222... is simply written as $0.\dot{2}$ and is read as "nought point two repeating."

Sometimes more than one number repeats.

For example $\frac{4}{11}$ = 0.363636.... is written as $0.\dot{3}\dot{6}$ because both digits repeat.

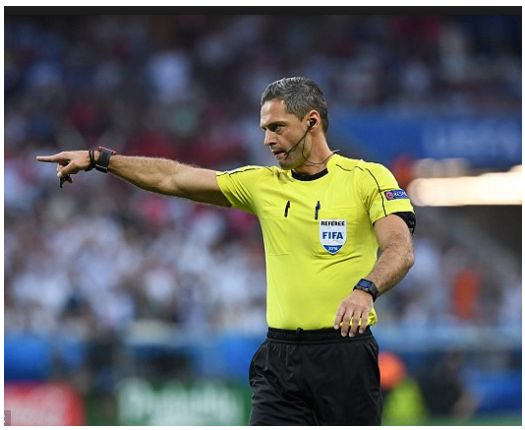
If more than 2 digits repeat, we only put a dot on the first and last repeating digits.

For example, 0.123123123... would be written as $0.\dot{1}2\dot{3}$

Fitness check

1. Write these decimals more concisely using the repeating notation.
   (a) 0.555... (b) 0.232323... (c) 0.247247247... (d) 0.571428571428571428...
2. Write out these decimals to show that you have mastered this notation.
   (a) $0.\dot{8}$ (b) $0.\dot{1}\dot{5}$ (c) $0.\dot{4}2\dot{6}$ (d) $0.\dot{3}417\dot{5}$

PENALTY!



Lots of sporting events are decided by a penalty shoot out if the scores end level after "normal time".

For example, in the 2006 Football World Cup, England went out in the quarter finals after the game was decided on penalties. Each team initially have 5 penalties. Portugal scored three times but England only scored once.

This wasn't the first time England had failed to win a penalty shoot out at the World Cup.

In fact, they have the worst penalty shoot performance of any nation, having lost every time.

So it isn't surprising that all teams practise taking penalties at all levels of the game.

So who is the best at taking penalty kicks?

The Premier league publish the "success" rate of each team over the season.

For the 2015-6 season, the clubs who were given the most penalties were

Leicester City	13 awarded, 10 scored
Manchester City	8 awarded, 5 scored
Watford	7 awarded, 6 scored
Everton	5 awarded, 4 scored

10 So which team, would you say, are the best "penalty kick" takers? Make sure, you explain your reasoning.

Alice's working



Alice

I wrote their success rate as fractions and changed them into decimals using my calculator.

Leicester City	$\frac{10}{13}$	0.769 (to 3dp.)
Manchester City	$\frac{5}{8}$	0.625
Watford	$\frac{6}{7}$	0.857 (to 3dp.)
Everton	$\frac{4}{5}$	0.8

So Watford are the best at penalties!



Percentages

Percentages make great headlines as they are eye-catching and easy to understand.

Percentage means "out of 100" or "parts per hundred".

To convert percentages to fractions, simply write the percentage as the numerator and 100 as the denominator.

For example $2\% = \frac{2}{100} = \frac{1}{50}$ and $30\% = \frac{30}{100} = \frac{3}{10}$

Fitness test

Write these percentages as fractions.

1. 50%
2. 25%
3. 75%
4. 20%
5. 40%
6. 80%
7. 5%
8. 7%
9. 11%
10. 15%
11. 35%
12. 65%

Percentages

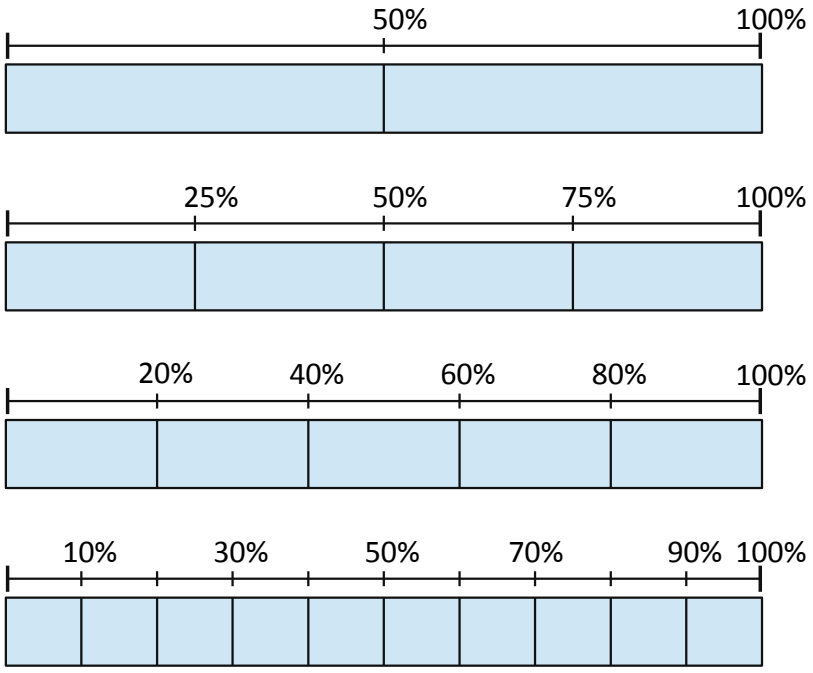
To convert decimals to percentages, simply multiply by 100.

For example 0.31 = 31% and 0.518 = 51.8%

Working with percentages

Percentages are another way to work out parts of a quantity. Per cent actually means 'out of 100', so 50% means 50 parts out of 100. In other words, finding 50% of a quantity is the same as finding $\frac{1}{2}$ of a quantity. Finding 25% of a quantity is the same as finding $\frac{1}{4}$ of a a quantity and so.

In each question a decision on the 'unit' of measure has to be made as illustrated below.



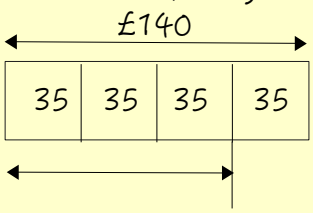
1% would mean drawing 100 boxes and probably isn't the most sensible approach!

11 Explain how you can use these ideas to find 75% of £140.



Evie

75% means, splitting into four boxes



140 ÷ 4 = 35

3 x 35 = 105

So 75% of £140 = £105

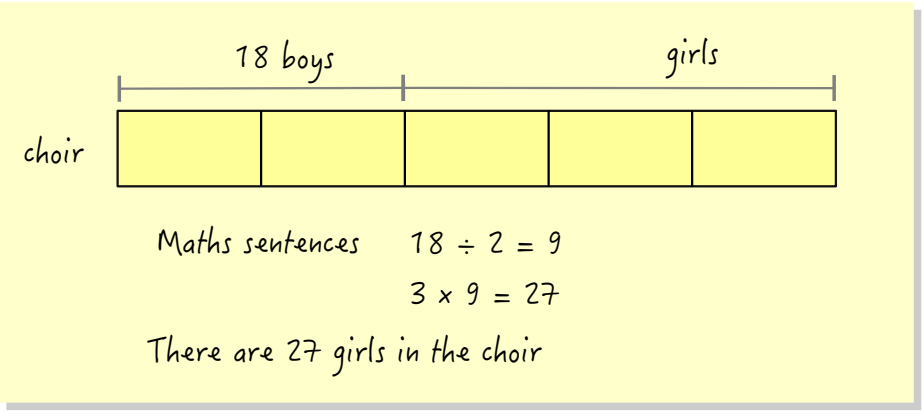
Puzzle Corner

1. $\frac{2}{5}$ of the choir are boys and the rest are girls. If there are 18 boys, how many girls are there in the choir?

Alice's working for Q1



Alice



2. Sarah has bought 36 flowers. $\frac{3}{4}$ of them are white. How many white flowers did Sarah buy?

3. 30% of the cars in the school car park are silver. If there are 24 silver cars in the car park, how many cars are there altogether?

4. There 240 pupils in Year 7 of which 70% have school lunch. How many pupils in Yr 7 have school lunch?

5. When asked, "Do you enjoy sport?", 60% of the pupils said "Yes". If 300 pupils said, "Yes", how many pupils were asked altogether?

6. Which is bigger 35% or $\frac{1}{3}$? Explain your reasoning?

7. Mark collects stamps. He says 40% of his stamps come from Europe. If he has 540 stamps altogether, how many come from Europe?

8. Amber planted 64 seeds in her garden. 48 actually grew into flowers. What percentage of seeds did not grow?

9. Find 35% of 120. Explain how you worked this out.

10. A railway carriage has 80 seats. 15% were occupied by children, 55% were occupied by adults. How many seats were empty?

Number 2b: Mastery questions

1. What fraction is equivalent to $\frac{1}{3}$?

A	$\frac{3}{5}$	B	$\frac{3}{9}$	C	$\frac{2}{4}$	D	$\frac{5}{7}$

2. What is $\frac{72}{120}$ when written in its simplest form?

A	$\frac{36}{60}$	B	$\frac{18}{30}$	C	$\frac{3}{5}$	D	$\frac{9}{15}$

3. Which is the biggest of these fractions?

A	$\frac{1}{2}$	B	$\frac{3}{5}$	C	$\frac{3}{7}$	D	$\frac{5}{11}$

4. Which is the biggest of these fractions?

A	$1\frac{3}{4}$	B	$1\frac{7}{8}$	C	$1\frac{1}{2}$	D	$\frac{13}{8}$

5. What is $\frac{25}{7}$ as a mixed number?

A	$\frac{4}{7}$	B	$4\frac{3}{7}$	C	$3\frac{4}{7}$	D	$1\frac{4}{7}$

6. Which of the following is $3\frac{4}{5}$ written as an improper fraction?

A	$\frac{24}{5}$	B	$\frac{19}{5}$	C	$\frac{7}{5}$	D	$\frac{17}{5}$

7. What is $\frac{2}{3}$ of 30?

A	45	B	42	C	40	D	20

8. 8 apples are shared equally amongst 6 people. How many apples does each person get? Write your answer in its simplest form.

A	$1\frac{2}{6}$	B	$1\frac{1}{3}$	C	$\frac{3}{4}$	D	$\frac{8}{6}$

Number 2b: Mastery questions

9. There are 32 pupils in 8Z of which 20 are girls. What fraction of the class are boys?

A	$\frac{5}{8}$	B	$\frac{3}{8}$	C	$\frac{3}{5}$	D	$\frac{2}{5}$

10. What is $\frac{1}{4} \div 2$

A	$\frac{1}{2}$	B	2	C	$\frac{1}{8}$	D	$\frac{4}{2}$

11. What is $\frac{1}{4} + \frac{3}{5}$?

A	$\frac{4}{9}$	B	$\frac{4}{20}$	C	$\frac{19}{20}$	D	$\frac{17}{20}$

12. What is $\frac{3}{4} - \frac{2}{3}$?

A	$\frac{1}{7}$	B	$\frac{1}{12}$	C	$\frac{9}{12}$	D	$\frac{17}{12}$

13. What is $2\frac{1}{5} - \frac{2}{3}$?

A	$1\frac{8}{15}$	B	$2\frac{13}{15}$	C	$1\frac{7}{8}$	D	$\frac{33}{15}$

14. What is $\frac{3}{4} \times \frac{8}{9}$ in its simplest form?

A	$\frac{24}{36}$	B	$\frac{6}{9}$	C	$\frac{8}{12}$	D	$\frac{2}{3}$

15. What is $\frac{2}{5} + \frac{1}{3} \times \frac{1}{2}$?

A	$\frac{3}{11}$	B	$\frac{3}{16}$	C	$\frac{11}{30}$	D	$\frac{17}{30}$

16. What is 30% of 70?

A	30	B	21	C	7	D	91

Number 2b: Mastery questions

17. Write 42% as a decimal

A	42	B	4.2	C	0.42	D	0.042

18. Write 30% as a fraction in its simplest terms

A	$\frac{1}{3}$	B	$\frac{30}{100}$	C	$\frac{3}{10}$	D	$\frac{300}{1000}$

19. Write 0.375 as a fraction in its simplest form.

A	$\frac{3}{8}$	B	$\frac{5}{8}$	C	$\frac{375}{1000}$	D	$\frac{37}{100}$

20. Amber scored 18 out of 40 in her Science assessment. Write this as a percentage.

A	30%	B	35%	C	40%	D	45%

21. Matthew achieved 60% in the same assessment. What was his actual score?

A	60	B	24	C	26	D	28

22. 75% of the boys in Yr 8 never wear a coat to school. If 28 boys actually do wear coats, how many boys are in Yr 8?

A	28	B	56	C	84	D	112

23. 7 girls in Yr 7 sometimes ride their bikes to school. If this represents 5% of the girls in Yr 7, how many girls are in Yr 7?

A	35	B	70	C	120	D	140

24. In a sports competition, the top 15% qualified for the final. If there 80 competitors entered, how many made the final?

A	8	B	12	C	15	D	18