








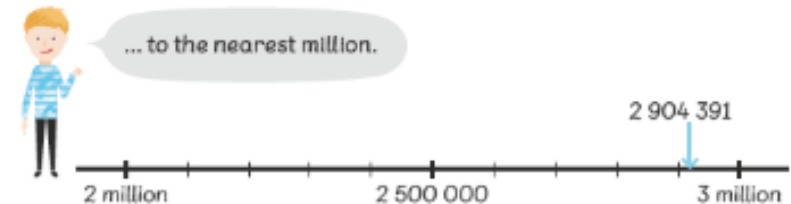
Year 6 Gold Knowledge Organiser: Numbers To 10 Million

Show 5 472 737 on a place-value chart.

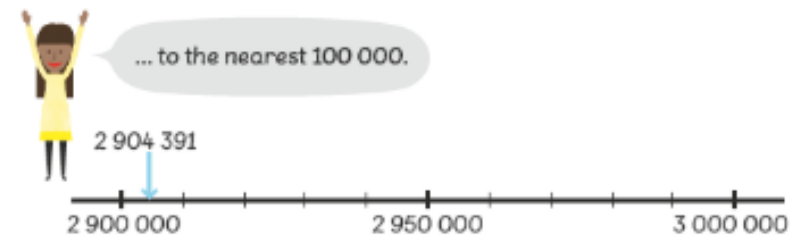
millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
						
millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
5	4	7	2	7	3	7

Can you recognise the value of digits to 10,000,000?

Round 2 904 391...



2 904 391 is closer to 3 million than to 2 million.
 $2\,904\,391 \approx 3\text{ million}$



2 904 391 is closer to 2 900 000 than to 3 000 000.
 $2\,904\,391 \approx 2\,900\,000$ (to the nearest 100 000)

Can you round numbers to the nearest million, hundred thousand and ten thousand?

Arrange these numbers in order, from the greatest to the smallest.



Can you order numbers up to 10,000,000?

Year 6 Gold Knowledge Organiser: Four Operations On Whole Numbers

$$(1 + 2) \div 3 \times 4 + 5 - 6$$

Step 1: Perform the calculation in the brackets first.

Step 2: Multiply or divide whichever comes first.

Step 3: Add or subtract whichever comes first.

Can you use knowledge of the order of operations to carry out calculations?

$$\begin{array}{r} 3296 \\ 32 \overline{) 3296} \\ \underline{- 3200} \\ 96 \\ \underline{- 96} \\ 0 \end{array}$$

3200 ÷ 32 = 100
96 ÷ 32 = 3

Can you divide numbers up to 4 digits by a 2 digit whole number?

1 × 20 = 20	1 × 15 = 15
2 × 20 = 40	2 × 15 = 30
3 × 20 = 60	3 × 15 = 45
4 × 20 = 80	4 × 15 = 60
5 × 20 = 100	5 × 15 = 75

60 is a common multiple of 20 and 15.

Can you identify common multiples?

Method 1

$$\begin{aligned} 414 \times 10 &= 4140 \\ 414 \times 20 &= 4140 + 4140 \\ &= 8280 \end{aligned}$$

Method 2

$$\begin{aligned} 414 \times 20 &= 414 \times 2 \times 10 \\ &= 828 \times 10 \\ &= 8280 \end{aligned}$$

Can you multiply numbers up to 4 digits by a multiple of 10?

$$\begin{array}{r} 1146 \\ 24 \overline{) 1146} \\ \underline{- 960} \\ 186 \\ \underline{- 168} \\ 18 \end{array}$$

960 ÷ 24 = 40
168 ÷ 24 = 7
18 ÷ 24 = 0.75

Can you divide numbers up to 4 digits by a 2 digit whole number, with remainders and express remainders as a fraction or decimal?

$$\begin{aligned} 156 &= 1 \times 156 \\ 156 &= 2 \times 78 \\ 156 &= 3 \times 52 \\ 156 &= 4 \times 39 \\ 156 &= 6 \times 26 \\ 156 &= 12 \times 13 \end{aligned}$$

$$\begin{aligned} 132 &= 1 \times 132 \\ 132 &= 2 \times 66 \\ 132 &= 3 \times 44 \\ 132 &= 4 \times 33 \\ 132 &= 6 \times 22 \\ 132 &= 11 \times 12 \end{aligned}$$

1, 2, 3, 4, 6, 12 are all the common factors of 156 and 132. So 12 is the largest common factor.

Can you identify common factors and the lowest common factor?

$$\begin{array}{r} 320 \\ \times 30 \\ \hline 9600 \end{array} \quad \begin{array}{r} 320 \\ \times 1 \\ \hline 320 \end{array} \quad \begin{array}{r} 320 \\ \times 31 \\ \hline 9600 \\ + 320 \\ \hline 9920 \end{array}$$

Can you multiply numbers up to 4 digits by a 2 digit whole number?



Flags are placed 42 cm apart.

(a) Find the distance between the 1st and the 10th flags.

(b) What is the largest number of flags there could be in a row 80 m long?

Can you solve word problems involving the four operations?

Prime

whole number that has only 2 factors

1 & number itself

$$\begin{array}{c} 3 \\ \swarrow \downarrow \searrow \\ 1 \times 3 \end{array} \quad \begin{array}{c} 7 \\ \swarrow \downarrow \searrow \\ 1 \times 7 \end{array}$$

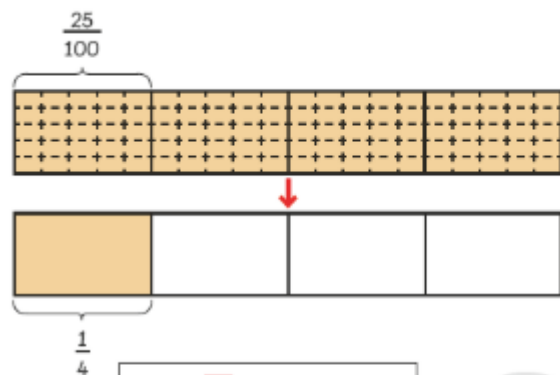
Composite

whole number that has more than 2 factors

$$\begin{array}{c} 12 \\ \swarrow \downarrow \searrow \\ 1 \times 12 \\ 2 \times 6 \\ 3 \times 4 \end{array} \quad \begin{array}{c} 6 \\ \swarrow \downarrow \searrow \\ 1 \times 6 \\ 2 \times 3 \end{array}$$

Can you identify prime and composite numbers?

Year 6 Gold Knowledge Organiser: Fractions



$$\frac{25}{100} = \frac{1}{4}$$

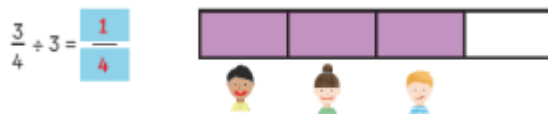
$25 = 1 \times 25$ $100 = 1 \times 100$
 $25 = 5 \times 5$ $100 = 2 \times 50$
 $100 = 4 \times 25$
 $100 = 5 \times 20$
 $100 = 10 \times 10$
 5 and 25 are common factors of 25 and 100.

Can you use common factors to simplify fractions?

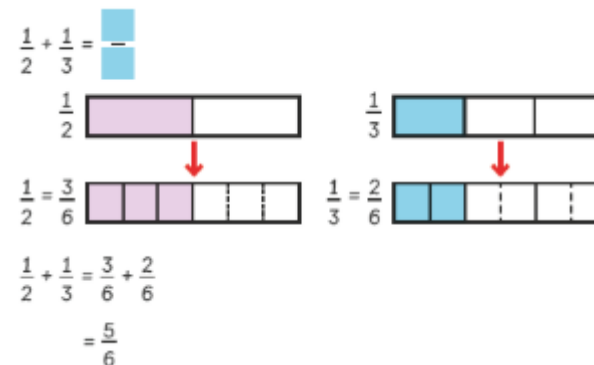
Compare $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{3}{4}$.



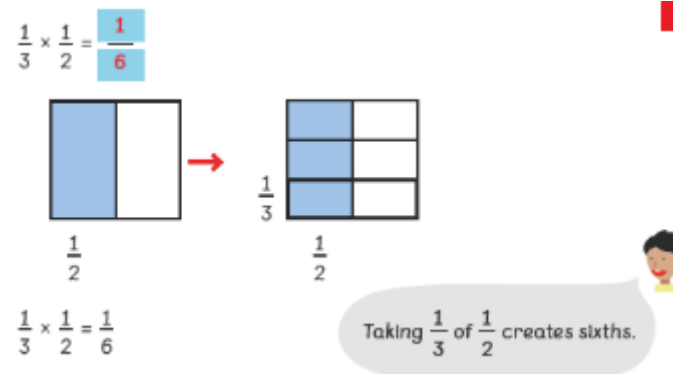
Can you compare and order fractions?



Can you divide fractions by whole numbers?

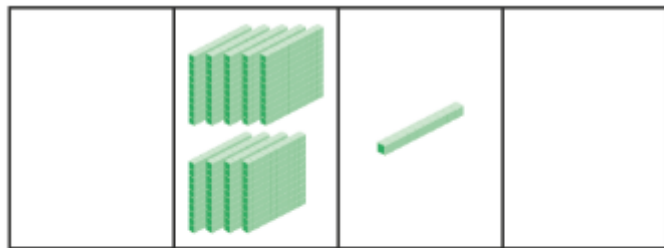


Can you add and subtract fractions with different denominators?

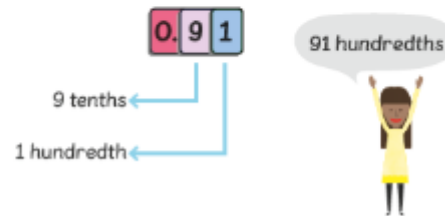


Can you multiply simple pairs of proper fractions and write the answer in the simplest form?

Year 6 Gold Knowledge Organiser: Decimals



This represents 0.91.



Can you identify the value of each digit in numbers up to 3 decimal places?

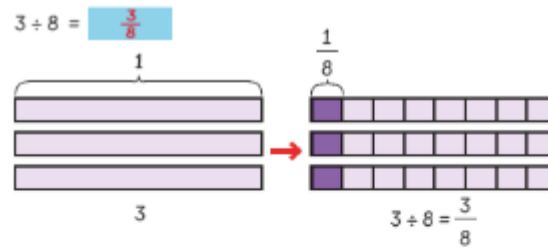
$$32 \div 10 = 3 + 2 \text{ tenths} = 3.2$$

30 2 = 20 tenths

$$32 \div 100 = 3200 \text{ hundredths} \div 100 = 32 \text{ hundredths} = 0.32$$

$$32 \div 1000 = 32000 \text{ thousandths} \div 1000 = 32 \text{ thousandths} = 0.032$$

Can you multiply and divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places?



$$3 \div 8 = 0.375$$

30 tenths $\div 8$?
300 hundredths $\div 8$?
3000 thousandths $\div 8$?

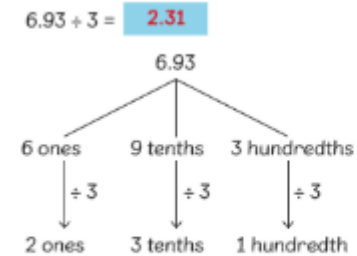
$$3000 \text{ thousandths} \div 8 = 375 \text{ thousandths} = 0.375$$

$$\text{So, } 3 \div 8 = \frac{3}{8} = 0.375.$$

$$\begin{array}{r} 375 \\ 8 \overline{) 3000} \\ \underline{- 2400} \\ 600 \\ \underline{- 560} \\ 40 \\ \underline{- 40} \\ 0 \end{array}$$

→ 300
→ 70
→ 5

Can you associate a fraction with division and calculate decimal fraction equivalents for a simple fraction?



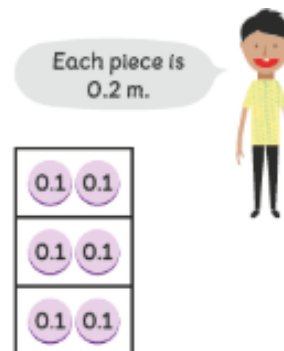
$$6.93 \div 3 = 2.31$$

$$\begin{array}{r} 2.31 \\ 3 \overline{) 6.93} \\ \underline{- 6} \\ 093 \\ \underline{- 09} \\ 03 \\ \underline{- 03} \\ 0 \end{array}$$

Can you divide 1-digit numbers with up to 2 decimal places by 1-digit whole numbers?

$$0.2 \times 3 = 0.6$$

$$0.2 \times 3 = 2 \text{ tenths} \times 3 = 6 \text{ tenths} = 0.6$$



Can you multiply 1-digit numbers with up to 2 decimal places by 1-digit whole numbers?

Year 6 Gold Knowledge Organiser: Measurements

$$1 \text{ mm} = 0.1 \text{ cm}$$

$$2 \text{ mm} = 0.2 \text{ cm}$$

$$12 \text{ mm} = 1.2 \text{ cm}$$

$$1 \text{ cm} = 10 \text{ mm}$$

Can you convert between centimetres and millimetres?

$$1 \text{ m } 2 \text{ cm} = 1.02 \text{ m}$$

$$100 \text{ cm} = 1 \text{ m}$$

$$1 \text{ cm} = \frac{1}{100} \text{ m} = 0.01 \text{ m}$$

$$2 \text{ cm} = 0.02 \text{ m}$$

$$1 \text{ m } 2 \text{ cm} = 1.02 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

Can you convert between centimetres and metres?

$$1 \text{ km } 25 \text{ m} = 1.025 \text{ km}$$

$$25 \text{ m} = \frac{25}{1000} \text{ km}$$

$$= 0.025 \text{ km}$$

$$1 \text{ km } 25 \text{ m} = 1.025 \text{ km}$$

$$1 \text{ km } 25 \text{ m} < 1.25 \text{ km}$$

$$1 \text{ km} = 1000 \text{ m}$$

Can you convert between metres and kilometres?

$$\text{Take } 1 \text{ mile} = 1.6 \text{ km.}$$

$$1 \text{ mile} = 1.6 \text{ km}$$

$$10 \text{ miles} = 16 \text{ km}$$

$$100 \text{ miles} = 160 \text{ km}$$

Can you convert between miles and kilometres?

$$2 \text{ kg } 60 \text{ g} = 2.06 \text{ kg}$$

$$1 \text{ kg} = 1000 \text{ g}$$

$$1000 \text{ g} = 1 \text{ kg}$$

$$100 \text{ g} = 0.1 \text{ kg}$$

$$10 \text{ g} = 0.01 \text{ kg}$$

$$60 \text{ g} = 0.06 \text{ kg}$$

$$2 \text{ kg } 60 \text{ g} = 2.06 \text{ kg}$$

$$1 \text{ kg} = 1000 \text{ g}$$



Can you convert between grams and kilograms?

$$1000 \text{ ml} = 1 \text{ l}$$

$$500 \text{ ml} = 0.5 \text{ l}$$

$$250 \text{ ml} = 0.25 \text{ l}$$

$$1 \text{ l} = 1000 \text{ ml}$$



Can you convert between litres and millilitres?

$$2.12 \text{ h} = 2 \text{ h } 7 \text{ min } 12 \text{ s}$$

$$1 \text{ h} = 60 \text{ min}$$

$$1 \text{ h} = 60 \text{ min}$$

$$0.1 \text{ h} = 6 \text{ min}$$

$$0.01 \text{ h} = 36 \text{ s}$$

$$0.02 \text{ h} = 72 \text{ s}$$

$$2.12 \text{ h} = 2 \text{ h } 7 \text{ min } 12 \text{ s}$$



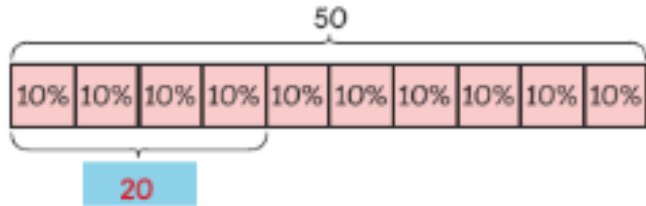
$$1 \text{ min} = 60 \text{ s}$$

$$6 \text{ min} = 360 \text{ s}$$

Can you convert between seconds, minutes and hours?

Year 6 Gold Knowledge Organiser: Percentage

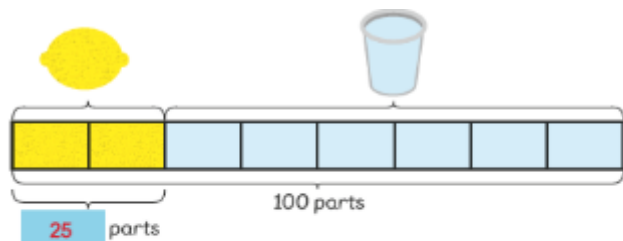
40% of 50 = **20**



10% $\rightarrow 50 \div 10 = 5$

40% $\rightarrow 4 \times 5 = 20$

Can you calculate percentages of whole numbers?



$100 \div 4 = 25$

25 out of 100 parts of the mixture is lemon syrup.

25% of the mixture is lemon syrup.

That means for every 100 ml of mixture, 25 ml is lemon syrup.

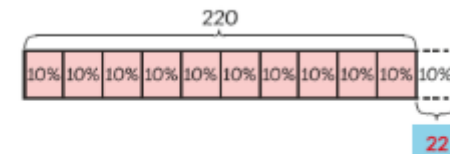


Can you calculate percentages of a quantity?

The number of pupils in a school has been increasing by about 10% each year since 2010. In 2011, the number of pupils was 220.



10% of 220 = **22**



10% of 220 = **22**

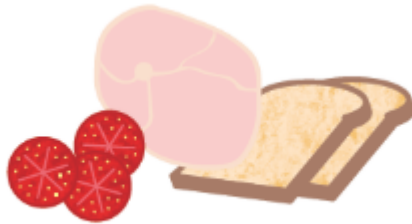
$220 \div 10 = 22$

In 2012, the number of pupils was $220 + 22$ or 242.



Can you calculate percentage changes?

Year 6 Gold Knowledge Organiser: Ratio



- (a) For every slice of ham, we need **2** slices of bread.
The ratio of the number of ham slices to bread slices = **1 : 2**.
- (b) For every slice of ham, we need **3** slices of tomato.
The ratio of the number of ham slices to tomato slices = **1 : 3**.
- (c) For every 2 slices of bread, we need **3** slices of tomato.
The ratio of the number of bread slices to tomato slices = **2 : 3**.



The number of girls is 3 times the number of boys.

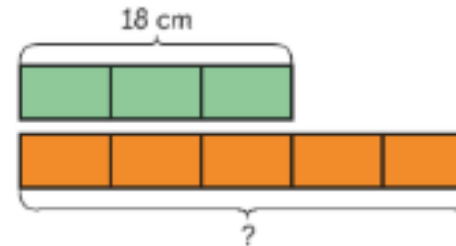
The number of boys is $\frac{1}{3}$ the number of girls.

The number of boys is 25% of the number of children.

The number of boys is $\frac{1}{4}$ the number of children.

The ratio of the length of a shorter strip of paper to the length of a longer strip of paper is 3 : 5.



- (a) If the shorter strip is 18 cm, how long is the longer strip?



$$18 \div 3 = 6 \text{ cm}$$

$$5 \times 6 = 30 \text{ cm}$$




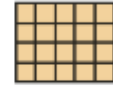
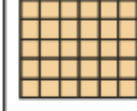
The longer strip is 30 cm.

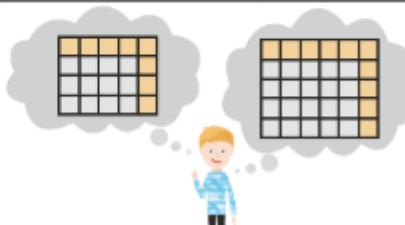
For every 3 , there are **2** .

Can you use ratio to compare two quantities?

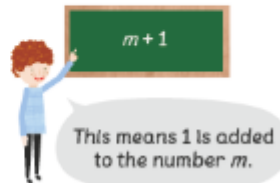
Year 6 Gold Knowledge Organiser: Algebra

Make Rectangle 4 and Rectangle 5.

Rectangle number	1	2	3	4	5
					



Rectangle number	Length of shorter side (units)	Length of longer side (units)
99	99	$99 + 1 = 100$
m	m	$m + 1$



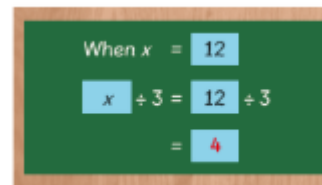
Can you generate and describe number patterns?

thinks of a number. He then multiplies it by 3.



Write an expression for the product.

$3x$



Can you express missing numbers algebraically?

's method

Let p stand for the n th number in the pattern.

$$p = 1 + 3n$$

This says that when $n = 2$, the 2nd number in the pattern is $1 + 3 \times 2 = 7$.

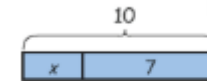
When $n = 6$, 6th number is $p = 1 + 3 \times 6 = 19$

When $n = 7$, 7th number is $p = 1 + 3 \times 7 = 22$

$p = 1 + 3n$ is a formula.

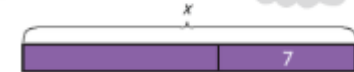
Can you use simple formulae?

(a) $x + 7 = 10$



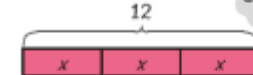
$3 + 7 = 10$

(b) $x - 7 = 10$



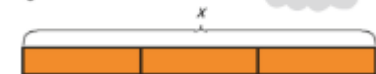
$17 - 7 = 10$

(c) $3x = 12$



$3 \times 4 = 12$

(d) $\frac{x}{3} = 12$



$36 \div 3 = 12$

Can you find pairs of numbers that satisfy an equation with two unknowns and list possible combinations?

Year 6 Gold Knowledge Organiser: Area & Perimeter



$$A = l \times b$$

$$p = 2l + 2b$$

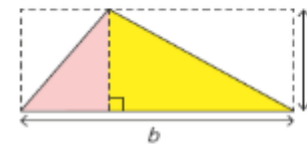
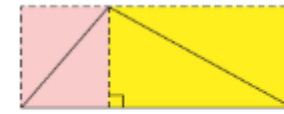
$2l$ means twice the value of l .

$2b$ means $2 \times b$.

This is also written as $A = lb$.

These are formulas (or formulae).

Can you use formulae for the area and perimeter of rectangles?



The area of the triangle is half the area of the large rectangle.

area of rectangle
= $(b \times h) \text{ cm}^2$

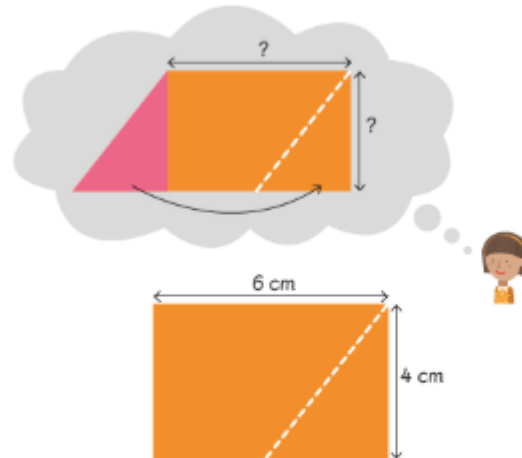
Area of triangle = $\frac{1}{2} \times$ area of rectangle

$$A = \frac{1}{2} \times b \times h$$

$$A = \frac{1}{2}bh$$

In algebra, we omit \times and write $\frac{1}{2} \times b \times h$ as $\frac{1}{2}bh$.

Can you calculate the area of triangles?



$$\begin{aligned} \text{Area of parallelogram} &= \text{area of rectangle} \\ &= (6 \times 4) \text{ cm}^2 \\ &= 24 \text{ cm}^2 \end{aligned}$$

For rectangles, $A = l \times b$.

Can you calculate the area of parallelograms?

Year 6 Gold Knowledge Organiser: Volume

 takes up 1 cubic centimetre of space.

's cuboid has a volume of 12 cm^3 .

1 cubic centimetre

1 cm^3

Can you measure volume in cubic centimetres?

Estimate the volume of a classroom.

How many 1-m^3 cubes fit in a row across the width of the room?

How many rows of these cubes fit in the floor space of the room?

How many layers are there to the ceiling?

What is the volume of your classroom?

Ours has a volume of about 210 m^3 .

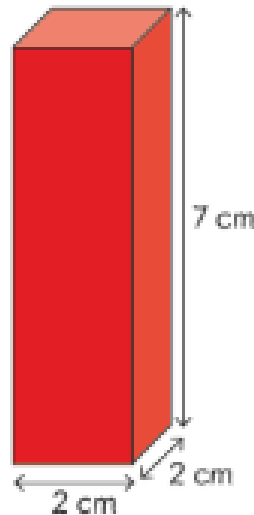
Can you estimate the volume?

Calculate the volume of the cuboid.

7 layers

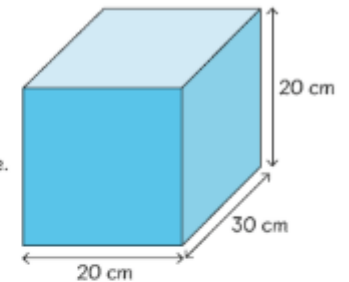
2×2 1-cm^3 cubes in each layer

$$\begin{aligned}\text{volume} &= (2 \times 2 \times 7) \text{ cm}^3 \\ &= (4 \times 7) \text{ cm}^3 \\ &= 28 \text{ cm}^3\end{aligned}$$



Can you calculate volume using a formula?

This solid metal cuboid is melted down to make cubes with 4-cm sides. Find the greatest number of cubes that can be made.



$$\begin{aligned}\text{volume of metal cuboid} &= (20 \times 20 \times 30) \text{ cm}^3 \\ &= 12\,000 \text{ cm}^3\end{aligned}$$

$$\begin{aligned}\text{volume of each cube} &= (4 \times 4 \times 4) \text{ cm}^3 \\ &= 64 \text{ cm}^3\end{aligned}$$

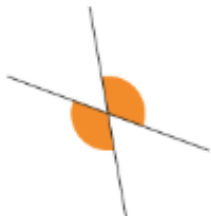
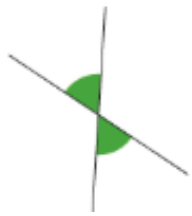


$$\begin{aligned}12\,000 \div 64 &= 187.5 \\ \text{number of cubes} &= 187\end{aligned}$$

Why shouldn't I round it up to 188?

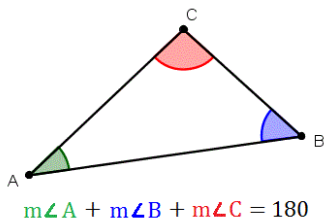
Can you solve problems involving volume?

Year 6 Gold Knowledge Organiser: Geometry

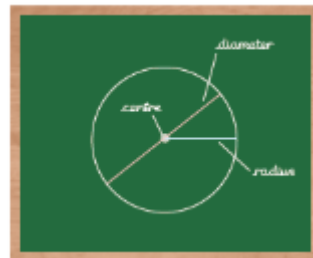


These are vertically opposite angles. Each pair of vertically opposite angles is equal.

Can you recognise vertically opposite angles and know that they are equal?

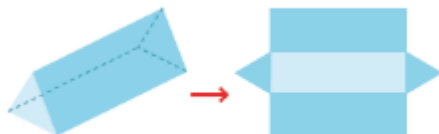


Do you know that angles in a triangle always add up to 180 degrees and use this to find unknown angles?



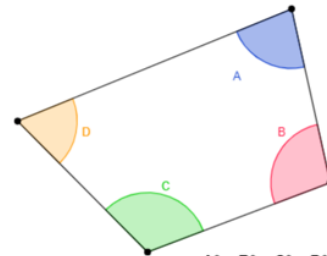
Can you name the parts of circles and know that the diameter is twice the radius?

Can you solve problems



Can you recognise and make nets for 3-D shapes?

Sum of **interior angles** in a quadrilateral = 360°

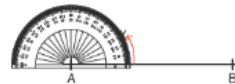


Do you know the angles of a quadrilateral always add up to 360 degrees?

Step 1: Draw a straight line 6 cm long using a ruler and pencil.



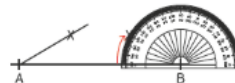
Step 2: Place a protractor to measure 30° . Mark X to show 30° .



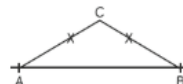
Step 3: Draw a line to show 30° .



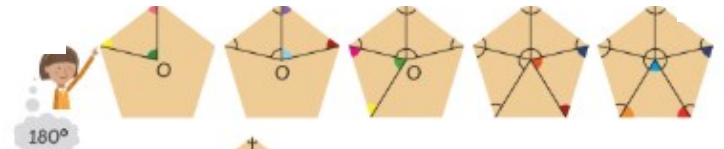
Step 4: Do the same at B.



Step 5: Continue the two lines until they meet at C.



Can you draw triangles and other shapes with given properties?



The angles of the  make up 5 triangles.

So the sum of the 5 angles of the pentagon + $360^\circ = 5 \times 180^\circ$.

If all 5 angles are equal,

then $5y = 5 \times 180^\circ - 360^\circ$

$5y = 540^\circ$

$y = 108^\circ$

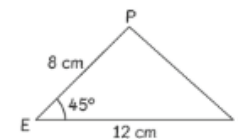


Why do we subtract?



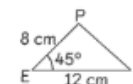
Can you solve problems involving angles in polygons?

 uses a scale of 1 : 2.

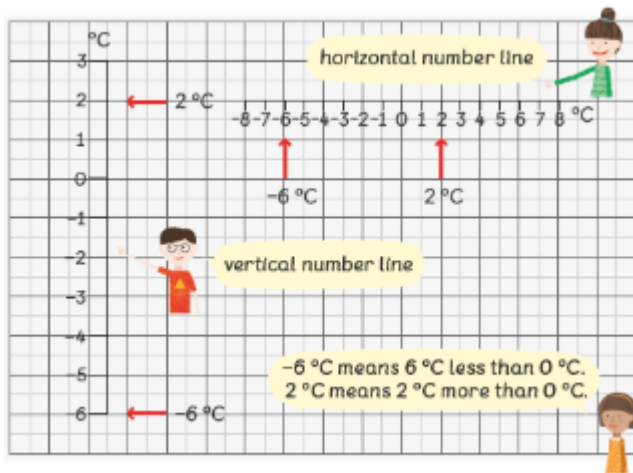


Can you solve problems where the scale factor is known or can be found?

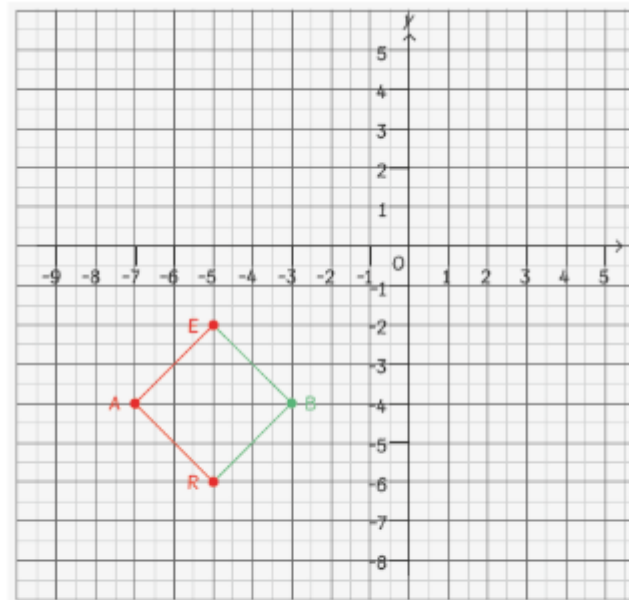
 uses a scale of 1 : 4.



Year 6 Gold Knowledge Organiser: Position & Movement

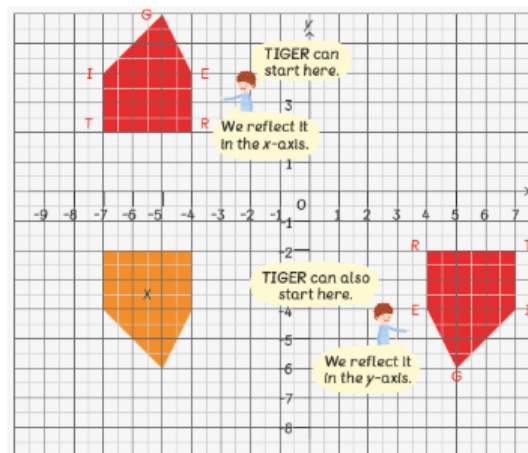


Can you calculate negative numbers in context?



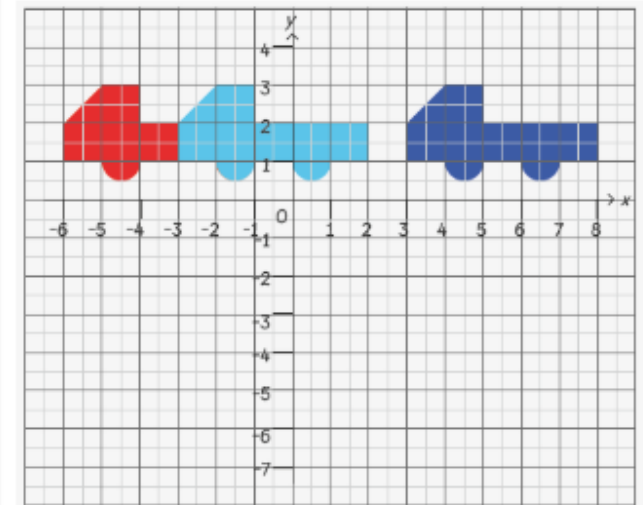
Quadrilateral BEAR is a square.
 In this case, B is $(-3, -4)$.

Can you draw simple shapes on a co-ordinate plane?



Can you reflect shapes in the axes?

starts from



Move to the left.

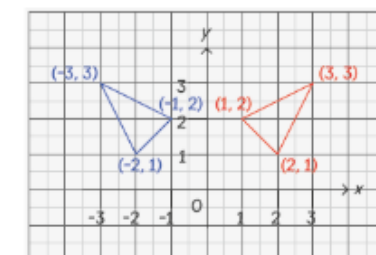
Move to the left.

This type of movement is a translation.

What other combination of throws moves to ?

Can you describe the translation of shapes on a co-ordinate grid?

The triangle is reflected in the y -axis.

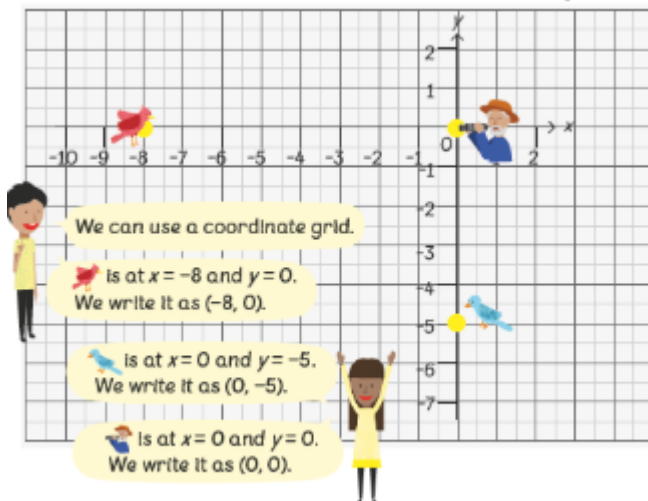


$(3, 3) \rightarrow (-3, 3)$
 $(2, 1) \rightarrow (-2, 1)$
 $(1, 2) \rightarrow (-1, 2)$

What do you notice?

$(a, b) \rightarrow (-a, b)$

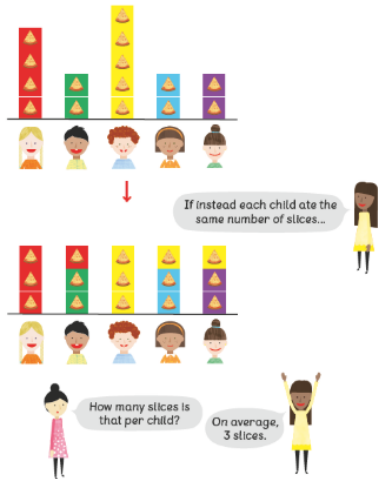
Can you use algebra to describe movement?



Can you describe positions on a full co-ordinate grid?

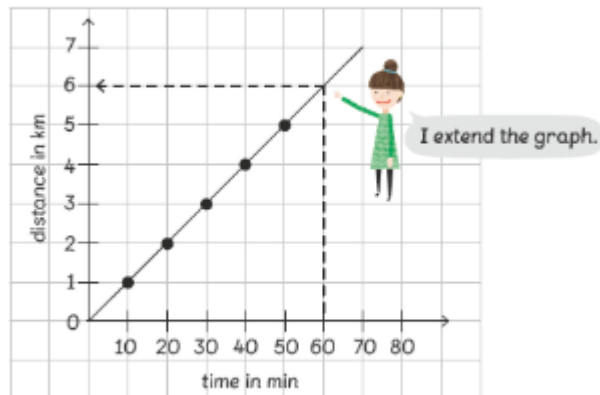
Year 6 Gold Knowledge Organiser: Graphs & Averages

's method



Can you interpret the mean as an average?

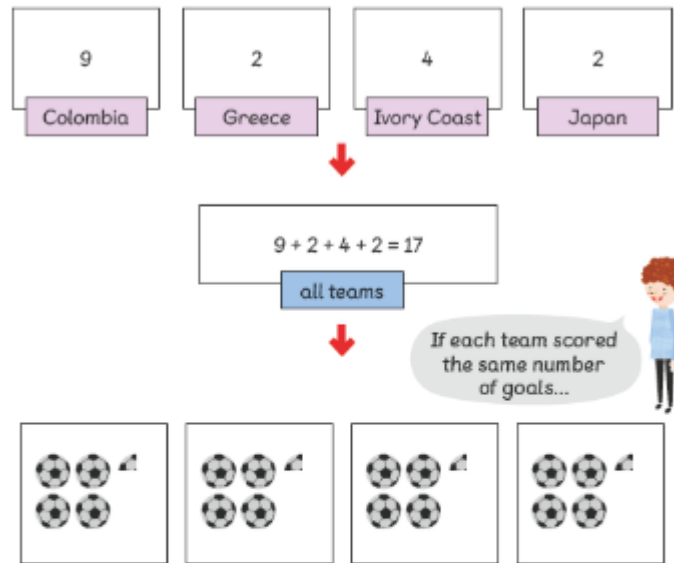
How far could walk in 1 hour at this speed?



At this speed, could walk 6 km in 1 hour.

Can you read and interpret line graphs?

Group C



Did each team really score $4\frac{1}{4}$ goals?

Can you calculate and interpret the mean as an average?

Can you solve problems involving the mean?

The table shows how a group of 48 pupils travel to school.

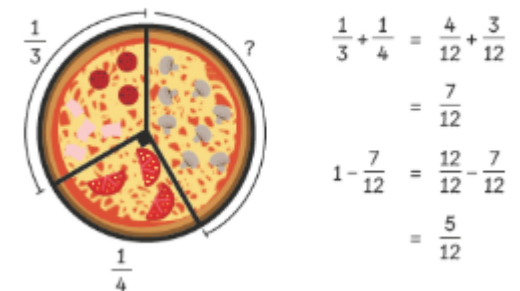
				others
24	4	8	12	0

Show the information on a pie chart.



Can you show information on graphs, including pie charts?

What fraction of the group chose mushrooms?

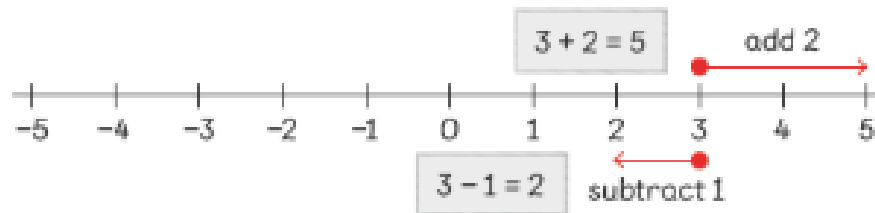


Can you read and interpret pie charts?

Year 6 Gold Knowledge Organiser: Negative Numbers

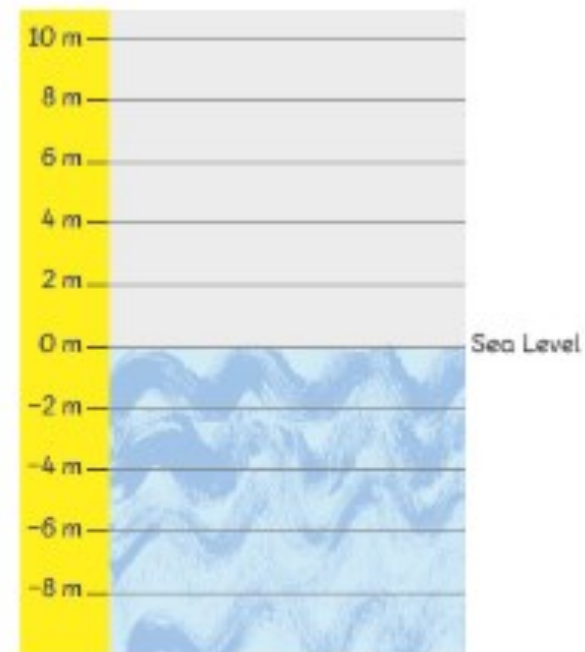


uses this method to add and subtract numbers.



Can you use negative numbers in context, and calculate intervals across zero?

The water level in a well rose 3 m from -8 m.



Is the new water level above or below sea level?

Can you use knowledge of negative numbers to solve problems?