

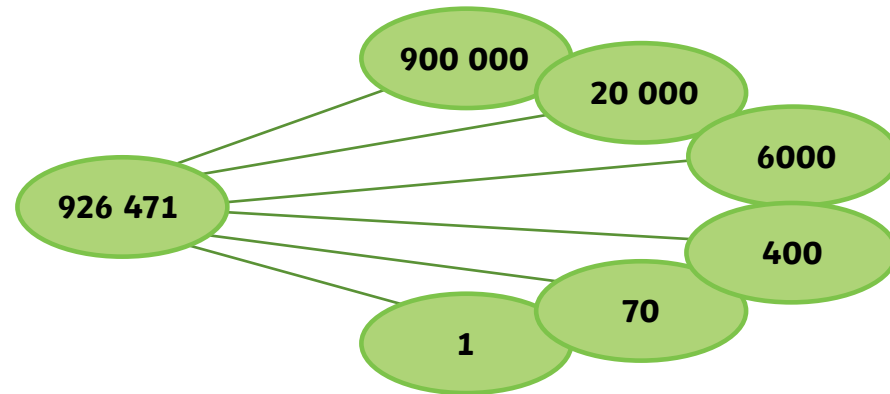
Key Vocabulary	Compare and Order								
millions	equals	greater than	less than						
thousands	$26 + 38 = 8 \times 8$	$23\ 873 > 8256$	$901\ 198 < 1\ 091\ 098$						
hundreds	Both calculations have the value 64.	The number on the left has 2 ten thousands and the number on the right has 0 ten thousands.	The number on the right has 1 million and the number on the left has 0 millions.						
tens									
ones									
zero									
place value	smallest	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">898</div> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">6735</div> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">6835</div> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">7019</div> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">9002</div> <div style="border: 1px solid orange; padding: 5px; background-color: #ffcc80;">11 235</div> </div>	greatest						
greater than	<h2>Negative Numbers</h2>								
less than									
order	<h2>Counting in Powers of 10</h2>								
round	Counting in 10s								
rounded	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #ffcc80;">365</td> <td style="background-color: #ffcc80;">375</td> <td style="background-color: #ffcc80;">385</td> <td style="background-color: #ffcc80;">395</td> <td style="background-color: #ffcc80;">405</td> <td style="background-color: #ffcc80;">415</td> </tr> </table>			365	375	385	395	405	415
365	375	385	395	405	415				
negative number	<p>The tens increase until 9 tens becomes one more hundred and 0 tens.</p>								
partition	Counting in 100s								
digit	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #ffcc80;">2841</td> <td style="background-color: #ffcc80;">2941</td> <td style="background-color: #ffcc80;">3041</td> <td style="background-color: #ffcc80;">3141</td> <td style="background-color: #ffcc80;">3241</td> <td style="background-color: #ffcc80;">3341</td> </tr> </table>			2841	2941	3041	3141	3241	3341
2841	2941	3041	3141	3241	3341				
interval	<p>The hundreds increase until 9 hundreds becomes one more thousand and 0 hundreds.</p>								
sequence	Counting in 10 000s								
linear sequence	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #ffcc80;">276 109</td> <td style="background-color: #ffcc80;">286 109</td> <td style="background-color: #ffcc80;">296 109</td> <td style="background-color: #ffcc80;">306 109</td> </tr> </table>			276 109	286 109	296 109	306 109		
276 109	286 109	296 109	306 109						
	<p>The ten thousands increase until 9 ten thousands become one more hundred thousand and 0 ten thousands.</p>								
	Counting in 100 000s								
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #ffcc80;">2 972 151</td> <td style="background-color: #ffcc80;">3 072 151</td> <td style="background-color: #ffcc80;">3 172 151</td> <td style="background-color: #ffcc80;">3 272 151</td> </tr> </table>			2 972 151	3 072 151	3 172 151	3 272 151		
2 972 151	3 072 151	3 172 151	3 272 151						
	<p>The hundred thousands increase until 9 hundred thousands becomes one more million and 0 hundred thousands.</p>								

## Numbers to One Million

# 926 471

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	2	6	4	7	1

nine hundred and twenty-six thousand, four hundred and seventy-one



### Roman Numerals

	I = 1	II = 2	III = 3	
IV = 4	V = 5	VI = 6	VII = 7	VIII = 8
IX = 9	X = 10	XI = 11	XX = 20	XXX = 30
XL = 40	L = 50	LX = 60	LXX = 70	LXXX = 80
XC = 90	C = 100	CL = 150	CC = 200	CCC = 300
CD = 400	D = 500	DC = 600	DCC = 700	DCCC = 800
CM = 900	M = 1000	MC = 1100	MD = 1500	MM = 2000



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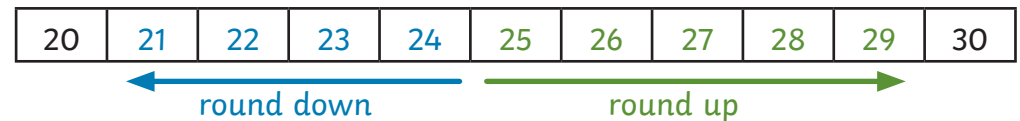
CCXLVIII = 248

DCCLXXXIV = 784

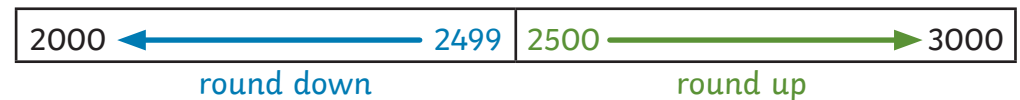
MMXIX = 2019

### Rounding

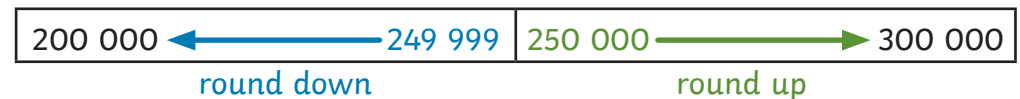
Rounding to the nearest 10



Rounding to the nearest 1000



Rounding to the nearest 100 000

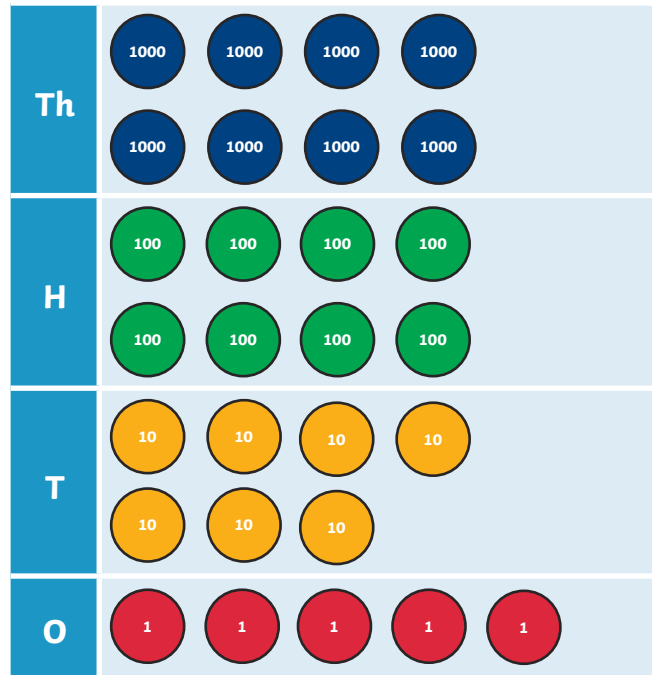


## Key Vocabulary

- Add
- Total
- Make
- Plus
- Sum
- More
- Altogether
- Difference
- Subtract
- Less
- Minus
- Take away
- Column addition
- Column subtraction
- Estimate
- Inverse operation
- Number facts
- Place value
- Complex

## Addition

Place Value Grid:  $3274 + 5601 = 8875$



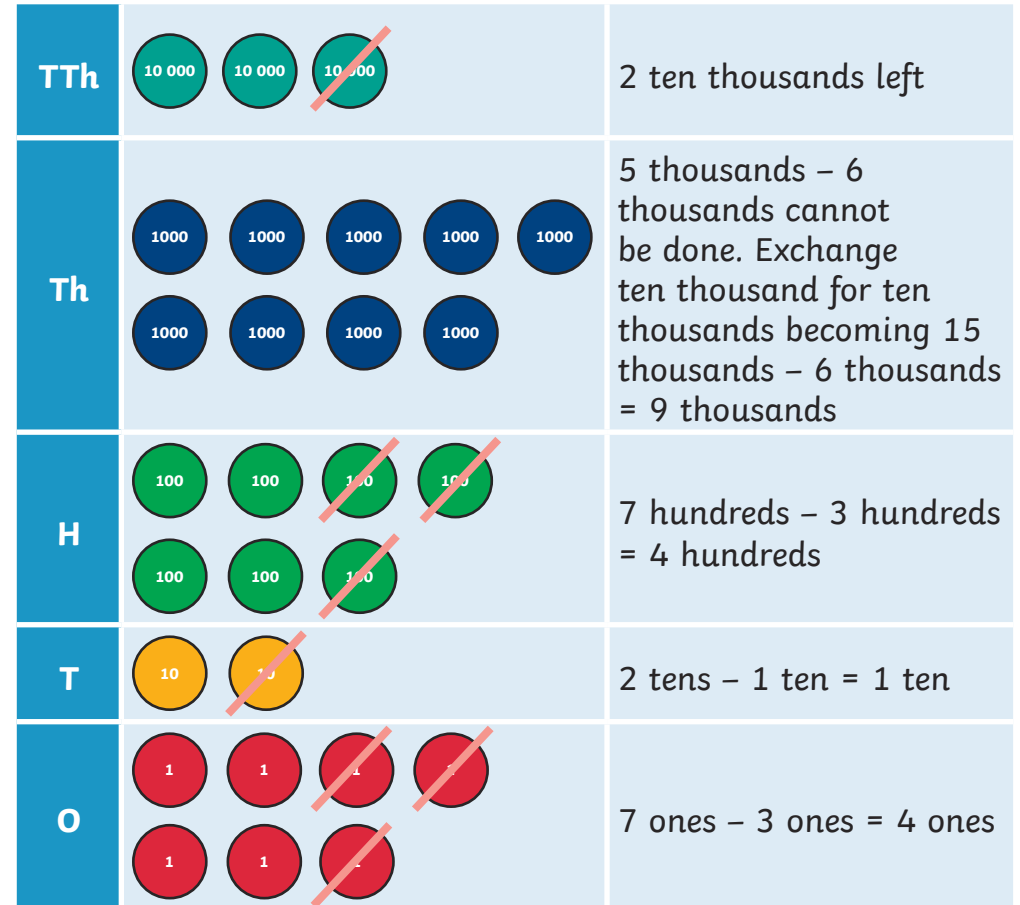
### Column Method

Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands and/or as required.

$$\begin{array}{r} 45864 \\ +23497 \\ \hline 69361 \\ \hline 111 \end{array}$$

## Subtraction

Place Value Grid:  $35\,727 - 6313 = 29\,414$



### Column Method

Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.

$$\begin{array}{r} 35727 \\ - 6313 \\ \hline 29414 \end{array}$$

Estimate and Approximate

Rounding to Estimate

$$41\ 635 + 7386 = 49\ 021$$

Round to ten:

$$41\ 630 + 7380 = 49\ 010$$

$$41\ 630 + 7390 = 49\ 020$$

$$41\ 640 + 7390 = 49\ 030$$

Rounding is not as accurate when both numbers are rounded up. A better estimate comes from "rounding" one down and one up.

Estimating on a Number Line



The arrow is about  $\frac{3}{4}$  of the way across the line so it is 40 000.



Inverse Operations

Use the inverse to check:

53 476	To check $53\ 476 - 32\ 732 = 20\ 744$ use $32\ 732 + 20\ 744 = 53\ 476$
32 732	
20 744	

Start with a number, subtract 409 and double. I end with 6264. To find the starting number use the inverse: halve, then add 409. Half of 6264 = 3132.  $3132 + 409 = 3541$ . The starting number was 3541.

Multistep Problems

Using a Bar Model

The sum of two numbers is 25 567.  
The difference is 1875.



Subtract 1875 from 25 567 = 23 692.  
Halve 23 692 to find smaller number = 11 846.  
Add 1875 to find larger number = 13 721.

£20			£20 is used to buy 2 books costing £3.75 and £8.49.
£3.75	£8.49	?	
£12.24		£7.76	How much change is given?

$$\begin{aligned} \pounds 3.75 + \pounds 8.49 &= \pounds 12.24 \\ \pounds 20.00 - \pounds 12.24 &= \pounds 7.76 \end{aligned}$$

# Multiplication and Division

# Knowledge Organiser

## Key Vocabulary

multiply
groups of
lots of
times
divide
share
remainder
factor
multiple
product

## Factors

A factor is a number that divides into another number exactly, without leaving a remainder.

A common factor is a factor of 2 or more numbers.

The factors of 20 are 1, 2, 4, 5, 10 and 20.

The factor pairs are:  
 1 and 20  
 2 and 10  
 4 and 5

## Prime Numbers

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	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

## Squared<sup>2</sup> and Cubed<sup>3</sup> Numbers

<p><math>2^2 = 4</math> <math>2 \times 2 = 4</math></p>	<p><math>2^3 = 8</math> <math>2 \times 2 \times 2 = 8</math></p>	<p><math>5^2 = 25</math> <math>5 \times 5 = 25</math></p>	<p><math>5^3 = 125</math> <math>5 \times 5 \times 5 = 125</math></p>
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## Related Calculations

$8 \times 9 = 72$	$9 \times 8 = 72$
$80 \times 9 = 720$	$90 \times 8 = 720$
$72 \div 9 = 8$	$72 \div 8 = 9$
$720 \div 9 = 80$	$720 \div 8 = 90$

Short Multiplication

$$2543 \times 7 = 17801$$

	2	5	4	3
×				7
<b>1</b>	<b>7</b>	<b>8</b>	<b>0</b>	<b>1</b>
1	3	3	2	

Remember to move any regrouped digits into the next column. After the next multiplication, add the regrouped number to the answer.

Long Multiplication

$$2543 \times 67 = 170381$$

		2	5	4	3		
	×			<b>6</b>	7		
		1	7	8	0	1	
		1	5	2	5	8	<b>0</b>
		1	3	2	1		
		<b>1</b>	<b>7</b>	<b>0</b>	<b>3</b>	<b>8</b>	<b>1</b>
		1	1				

Before multiplying by the number in the tens column, remember to use zero as a placeholder because the 6 in 67 is 6 tens (60).

Division

$$136 \div 4 = 34$$

		<b>3</b>	<b>4</b>	
4		1	3	6
-		1	2	0
			1	6
		-	1	6
				0

→  $30 \times 4$

→  $4 \times 4$



Short Division

		<b>3</b>	<b>8</b>	
4		1	<sup>1</sup> 5	<sup>3</sup> 2

$15 \div 4 = 3$  remainder 3  
Remember to regroup any remainders and move them into the next column.

		<b>4</b>	<b>5</b>	<b>5</b>	<b>r</b>	<b>3</b>
5		2	2	<sup>2</sup> 7	<sup>2</sup> 8	

$28 \div 5 = 5$  remainder 3  
If your calculation has a remainder, remember to record it in the answer using the letter **r**.

**Key Vocabulary**      **Equivalent Fractions**      **Compare and Order Fractions**

numerator  
denominator  
unit fraction  
non-unit fraction  
whole

To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.

$$\frac{1}{2} = \frac{5}{10} = \frac{50}{100}$$

We can compare and order fractions by using common denominators.

**equivalent**

**Mixed Numbers**

**Improper Fractions**

mixed number

Mixed numbers contain a whole number and a fraction.

An improper fraction has a numerator which is greater than or equal to the denominator.

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

improper fraction

**Convert an Improper Fraction to a Mixed Number**

**Convert a Mixed Number to an Improper Fraction**

simplest form  
multiple

$\frac{9}{4}$

$9 \div 4 = 2r1$        $2\frac{1}{4}$

Divide the numerator by the denominator.

This shows you the whole number and the fraction.

Multiply the whole by the denominator to make an improper fraction.

$2\frac{5}{6} = \frac{12}{6} + \frac{5}{6} = \frac{17}{6}$

Add the fractions together.

common denominator

**Adding and Subtracting Fractions**

common numerator

To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.



$$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$$

$$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

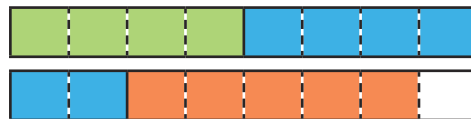
$$\frac{5}{6} - \frac{2}{3} = \frac{5}{6} - \frac{4}{6} = \frac{1}{6}$$

# Fractions

# Knowledge Organiser

## Add Fractions Where the Total is Greater Than 1

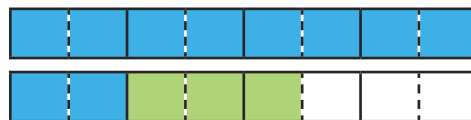
$$\frac{1}{2} + \frac{3}{4} + \frac{5}{8} = \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{15}{8} = 1\frac{7}{8}$$



## Add Mixed Numbers

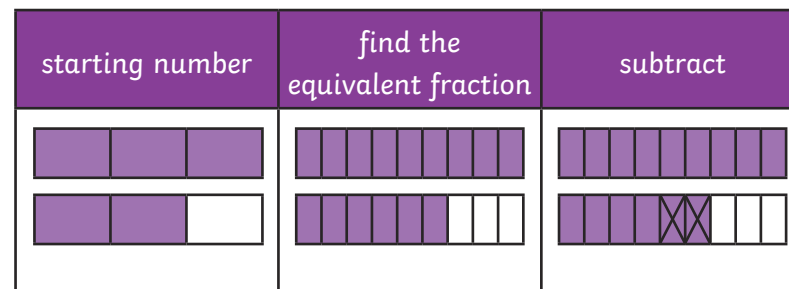
$$1\frac{1}{4} + \frac{3}{8} = 1\frac{2}{8} + \frac{3}{8} = 1 + \frac{5}{8} = 1\frac{5}{8}$$

$$1\frac{1}{4} + \frac{3}{8} = \frac{5}{4} + \frac{3}{8} = \frac{10}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$$



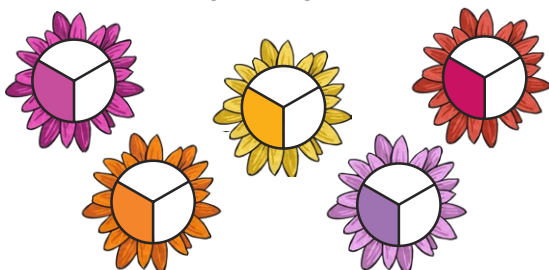
## Subtract from a Mixed Number

$$1\frac{2}{3} - \frac{2}{9} = 1\frac{6}{9} - \frac{2}{9} = 1\frac{4}{9}$$



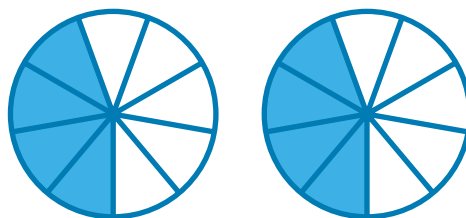
## Multiply Unit Fractions by an Integer

$$\frac{1}{3} \times 5 = \frac{5}{3}$$



## Multiply Non-Unit Fractions by an Integer

$$2 \times \frac{4}{9} = \frac{8}{9}$$



## Subtract Two Mixed Numbers

$$2\frac{3}{4} - 1\frac{5}{8} = 1\frac{1}{8}$$



$$2 - 1 = 1$$

$$\frac{3}{4} - \frac{5}{8} = \frac{1}{8}$$

## Multiply Mixed Numbers by Integers

Convert to an improper fraction and multiply the numerator by the integer.

$$2\frac{1}{4} \times 2 = \frac{9}{4} \times 2 = \frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$$

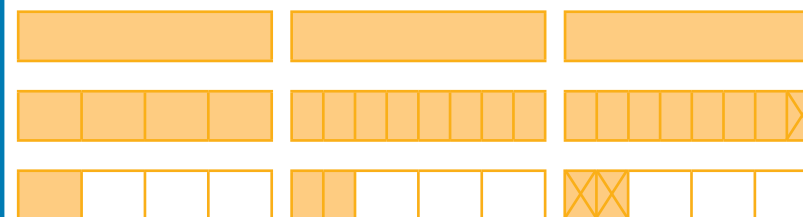
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Use repeated addition.

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

## Subtract from a Mixed Number - Breaking the Whole

$$2\frac{1}{4} - \frac{3}{8} = 2\frac{2}{8} - \frac{3}{8} = 1\frac{10}{8} - \frac{3}{8} = 1\frac{7}{8}$$



# Decimals

# Knowledge Organiser

## Key Vocabulary

## Tenths, Hundredths and Thousandths

tenths



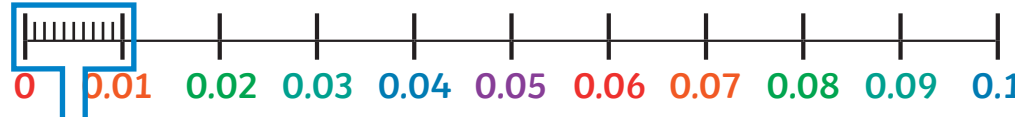
hundredths



decimal tenths



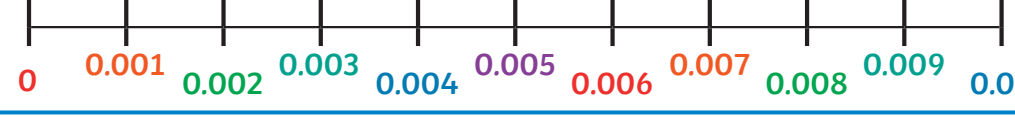
decimal hundredths



decimal equivalents



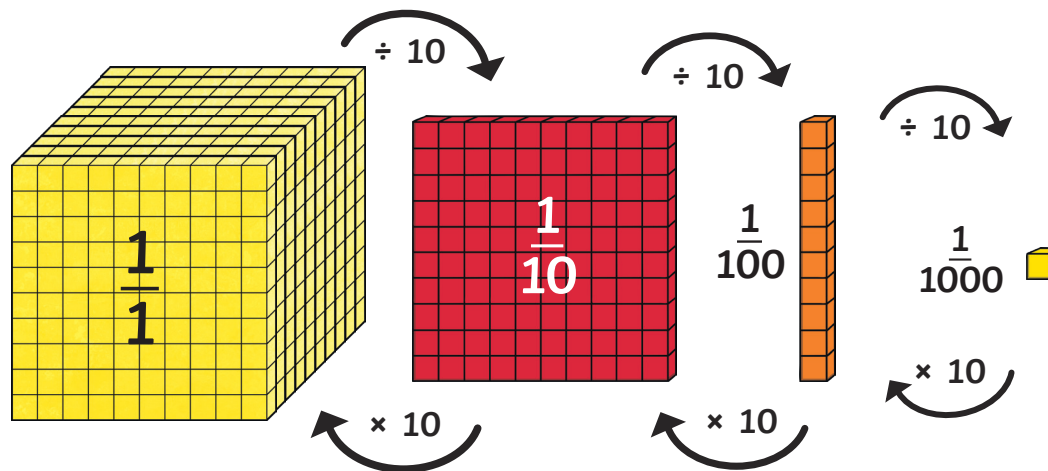
part-whole model



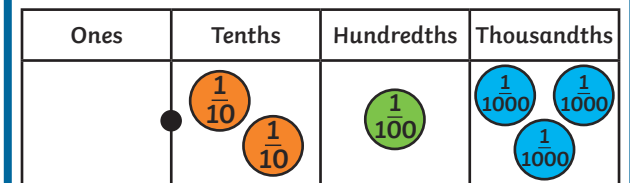
rounding

decimal point

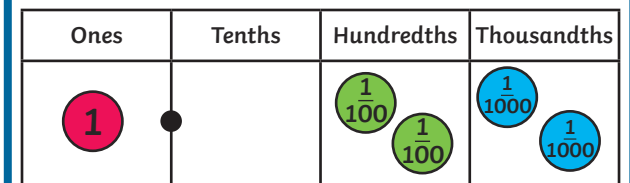
place value



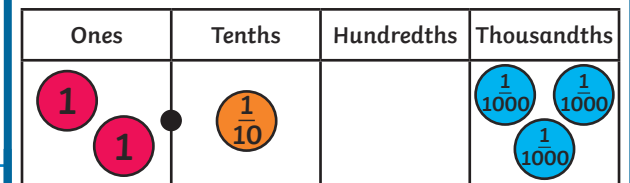
## Order and Compare Numbers with Three Decimal Places



0 . 2 1 3



1 . 0 2 2



2 . 1 0 3

## Decimal Numbers as Fractions

$$0.71 = \frac{71}{100} = \frac{7}{10} + \frac{1}{100}$$

$$0.37 = \frac{37}{100} = \frac{3}{10} + \frac{7}{100}$$

# Decimals

# Knowledge Organiser

## Multiplying and Dividing by 10, 100 and 1000

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	3	8		
3	8			

$\div 10$  (arrow from 38 to 3.8)  
 $\times 10$  (arrow from 3.8 to 38)

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	0	3	8	
3	8			

$\div 100$  (arrow from 38 to 0.38)  
 $\times 100$  (arrow from 0.38 to 38)

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	0	0	3	8
3	8			

$\div 1000$  (arrow from 38 to 0.038)  
 $\times 1000$  (arrow from 0.038 to 38)

## Adding and Subtracting Decimals

$$0.8 + 0.001 = 0.801$$

$$1.031 - 0.23 = 0.801$$

$$0.4005 + 0.4005 = 0.801$$



## Rounding Decimals



If the tenths digit is 1, 2, 3 or 4, we round down to the nearest whole number.

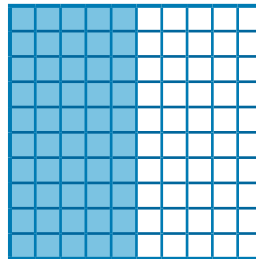
If the tenths digit is 5, 6, 7, 8 or 9, we round up to the nearest whole number.



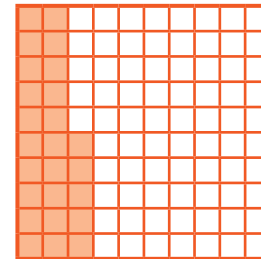
If the hundredths digit is 1, 2, 3 or 4, we round down to the nearest tenth.

If the hundredths digit is 5, 6, 7, 8 or 9, we round up to the nearest tenth.

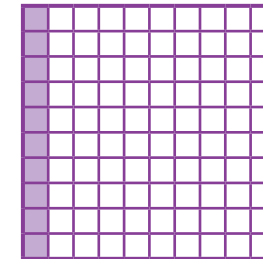
## Percentage and Decimal Equivalents



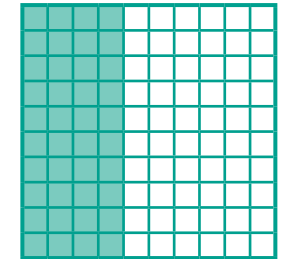
$$50\% = \frac{50}{100} = \frac{1}{2} = 0.5$$



$$25\% = \frac{25}{100} = \frac{1}{4} = 0.25$$



$$10\% = \frac{10}{100} = \frac{1}{10} = 0.1$$

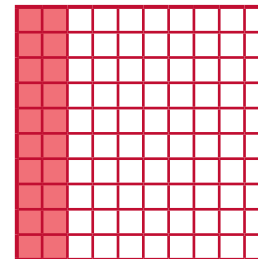


$$40\% = \frac{40}{100} = \frac{2}{5} = 0.4$$

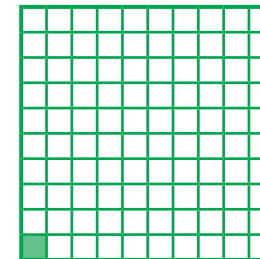
## Crossing the Whole

$$0.82 + 0.63 = 1.45$$

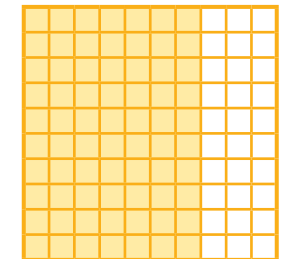
$$2.531 - 0.6 = 1.931$$



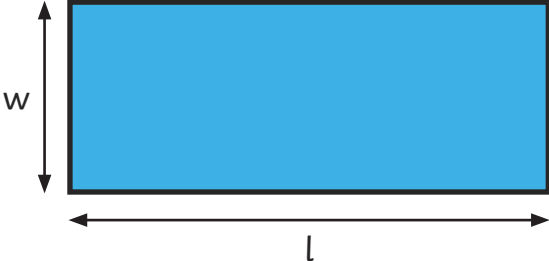
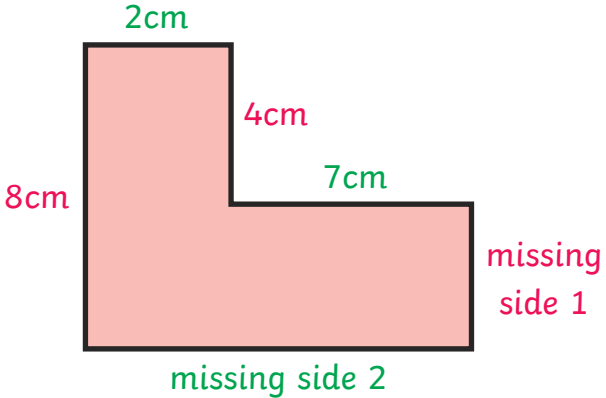
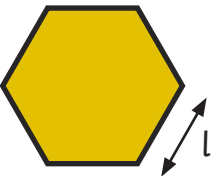


$$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$$



$$1\% = \frac{1}{100} = 0.01$$



$$70\% = \frac{70}{100} = \frac{7}{10} = 0.7$$

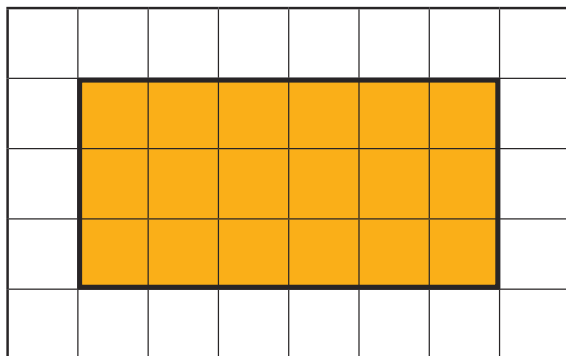
Key Vocabulary	Measure Perimeter	Calculate Perimeter		
metre	Measure the perimeter of a rectangle: 	Calculate the missing sides of this rectilinear shape to find the perimeter: 		
kilometre			Measure the length (l) and width (w). $Perimeter = l + w + l + w$ or $(l + w) \times 2$	* This shape is not drawn to the dimensions specified.
perimeter			Measure the perimeter of regular shapes:  Measure the length (l) and count the number of sides (s) on the shape. $Perimeter = l \times s$	$Missing\ side\ 1 + 4cm = 8cm,$ $so\ missing\ side\ 1 = 4cm.$
length	Measure the perimeter of irregular shapes: 	$Missing\ side\ 2 = 2cm + 7cm = 9cm$		
width		Measure the length of each side and add them together.	$Perimeter = sum\ of\ all\ sides =$ $2cm + 4cm + 7cm + 4cm + 9cm + 8cm = 34cm$	
rectangle				
rectilinear				
dimensions				
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# Length and Perimeter

# Knowledge Organiser

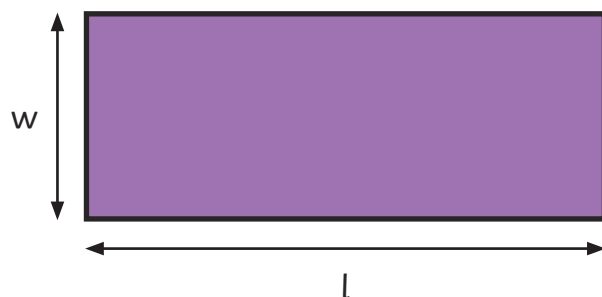
## Area of Rectangles

The area of a rectangle on a grid:



Multiply the length  $\times$  width  
 $= 6 \times 3 = 18$  squares.

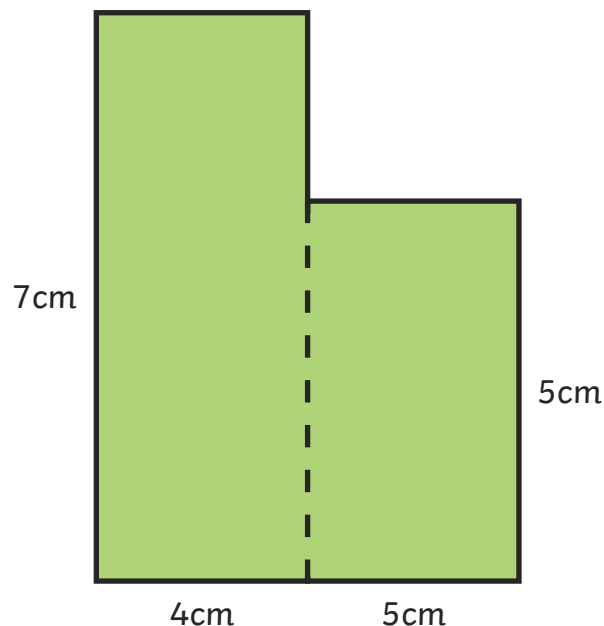
The area of a rectangle = length (l)  $\times$  width (w).



visit [twinkl.com](https://www.twinkl.com)

## Area of Compound Shapes

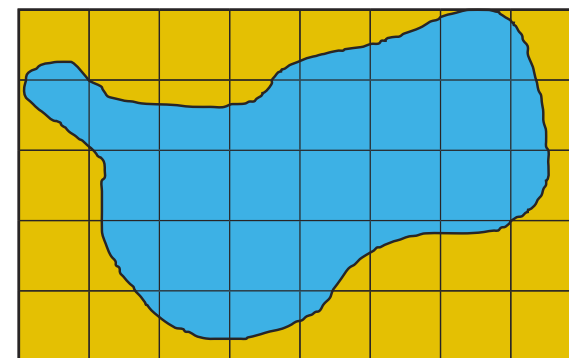
To find the area of a compound shape, divide the shape into rectangles with known dimensions:



$$\begin{aligned} \text{Area} &= 7\text{cm} \times 4\text{cm} + 5\text{cm} \times 5\text{cm} \\ &= 28\text{cm}^2 + 25\text{cm}^2 \\ &= 53\text{cm}^2 \end{aligned}$$

## Area of Irregular Shapes

To find the area of an irregular shape, find the number of whole squares and part squares.



Whole squares = 10  
Part squares = 22

$$\begin{aligned} \text{Estimate of area} &= \text{whole squares} + \\ &\quad \text{half part squares} \\ &= 10\text{cm}^2 + 11\text{cm}^2 = 21\text{cm}^2 \end{aligned}$$

\*There are other ways to estimate the area of irregular shapes.

Key Vocabulary

axis
continuous data
horizontal
data
interpret
label
line graph
maximum value
minimum value
pattern
predict
relationship
represent
scale
survey
table
tally
timetable
vertical
x-axis
y-axis

Reading and Understanding Tables

A table to show ticket prices at a local cinema.

Ticket Type	Weekday Price	Weekend Price
Adult	£6	£7.50
Child	£4	£4.50
Student	£5.50	£6

In order to understand the data presented in a table, you must read the **table's title** and the **headings**. Remember to always look at the heading that **each piece of information** falls under.

Completing Tables

Here is a table showing the favourite drink flavours of some children.

	Boys	Girls	Total
Orange	8		18
Blackcurrant		6	
Total	15		

To find how many boys voted for blackcurrant, look at the total number of boys who voted and subtract the number of votes for orange.

To find how many girls voted for orange, look at the total number of votes for orange and subtract the number of votes from boys.

To find the total number of votes for blackcurrant, the total number of girls or the total number of voters, simply add up the values from the appropriate row or column.

Timetables

Here is a bus timetable:

Three different buses

Bus stop locations	0726	0803	0833	0842	0845	0919	0946
Mill Road							
High Street							
Pitsmoor Road							
Fulwood							

The bus starts at this time and location.

The bus does not stop here.

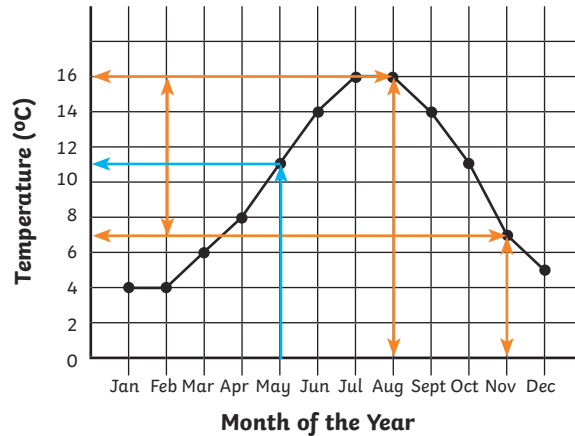
The bus terminates at this time and location.

Read and Interpret Line Graphs

Here is a line graph showing the average temperature for each month.

The y-axis shows temperature in intervals of 2°C on a scale of 0°C to 16°C.

The points show the average temperature for each month.



The x-axis shows the months of the year.

Use Line Graphs to Solve Problems

To find the average temperature in May, follow the arrow up from May and across to the temperature. As this is halfway between 10°C and 12°C, the average temperature in May is 11°C.

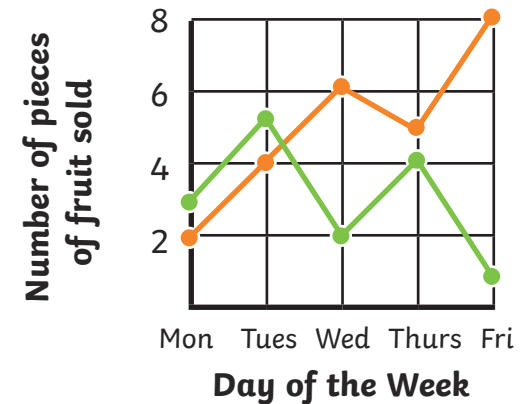
To find the difference between the average temperatures in August and in November, find the temperature for each month and calculate the difference between the two. The shape of the line graph can show how the temperature changed. The average temperature falls 9°C from August to November.

Draw Line Graphs

Here is a table showing the number of different types of fruit sold each day.

	Bananas	Apples
Mon	2	3
Tues	4	5
Wed	6	2
Thurs	5	4
Fri	8	1

This graph can be used to represent the data from the table.



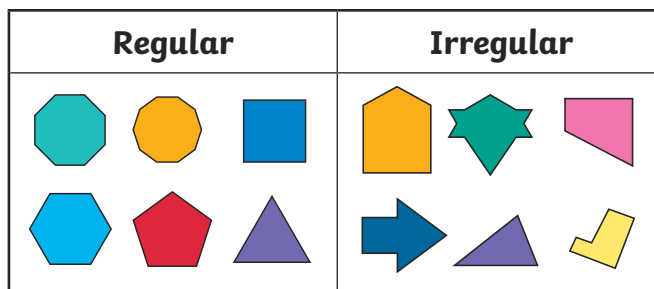
Mark each point for the number of bananas sold each day and join each point with a line.

Mark each point for the number of apples sold each day and join each point with a line.

## Key Vocabulary

- angle
- right angle
- acute
- obtuse
- reflex
- protractor
- horizontal
- vertical
- parallel
- perpendicular
- polygon
- regular
- irregular
- two-dimensional
- three-dimensional
- flat face
- curved surface
- edge
- curved edge
- vertex
- apex

## Regular and Irregular Polygons



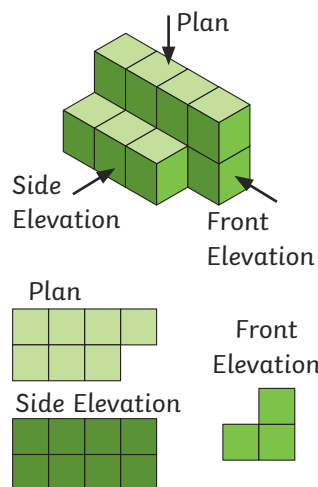
A polygon is any two-dimensional shape formed with straight lines.

In a regular polygon, all the sides and angles are equal.

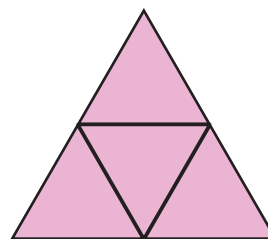
In an irregular polygon, the sides and angles are not equal.

## Representations

Cube models can be drawn as 2D representations using different elevations.












A shape net is a 2D drawing of an unfolded 3D shape. When you are drawing or reasoning about shape nets, think carefully about where the edges of the faces meet.



Shape net of a tetrahedron.

## Properties of 3D Shapes

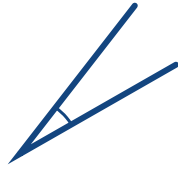
Name	Surfaces		Edges		Vertices	Picture
	Flat	Curved	Flat	Curved		
cube	6	0	12	0	8	
cuboid	6	0	12	0	8	
square-based pyramid	5	0	8	0	5	
tetrahedron	4	0	6	0	4	
triangular prism	5	0	9	0	6	
pentagonal prism	7	0	15	0	10	
hexagonal prism	8	0	18	0	12	
octagonal prism	10	0	24	0	16	
octahedron	8	0	12	0	6	

A cone has an apex. This is because a vertex is the point where two straight edges meet and a cone has no straight edges.

Identifying Angles

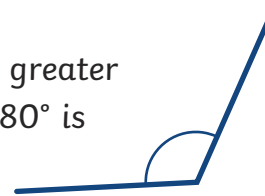
**Acute Angles**

Any angle that measures less than  $90^\circ$  is called an **acute** angle.



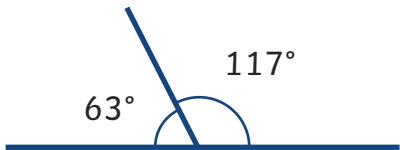
**Obtuse Angles**

Any angle that measures greater than  $90^\circ$  and less than  $180^\circ$  is called an **obtuse** angle.

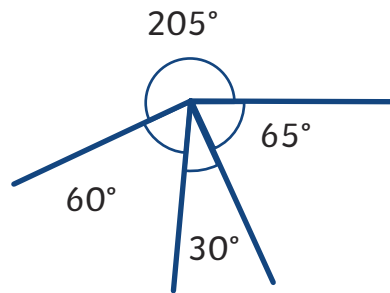


**Reflex Angles**

Any angle that measures greater than  $180^\circ$  is called a **reflex** angle.



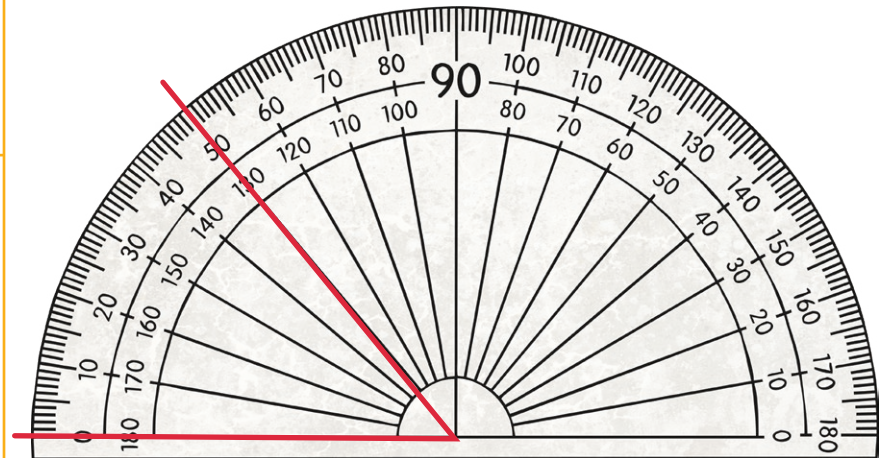
Angles on a straight line always total  $180^\circ$ .



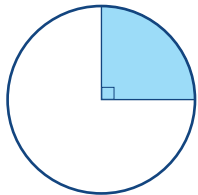
Angles around a point always total  $360^\circ$ .

**Measuring and Drawing Angles**

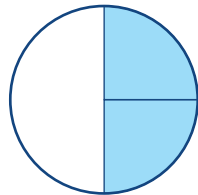
To measure angles, we use a protractor. Look carefully at how the numbers on the scale count from  $0^\circ$  to  $180^\circ$  in both directions.



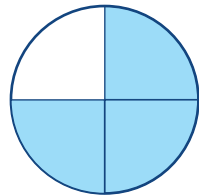
Multiples of  $90^\circ$  can be used as descriptions of a turn.



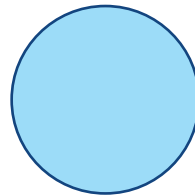
$\frac{1}{4}$  turn -  $90^\circ$



$\frac{1}{2}$  turn -  $180^\circ$

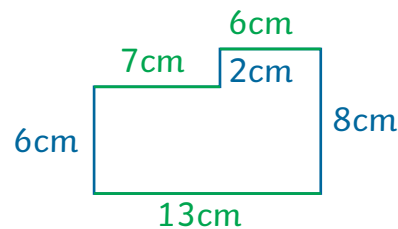


$\frac{3}{4}$  turn -  $270^\circ$



1 turn -  $360^\circ$

Using Properties of Rectangles



$6\text{cm} + 2\text{cm} = 8\text{cm}$

$7\text{cm} + 6\text{cm} = 13\text{cm}$

## Key Vocabulary

coordinate

quadrant

x-axis

y-axis

reflection

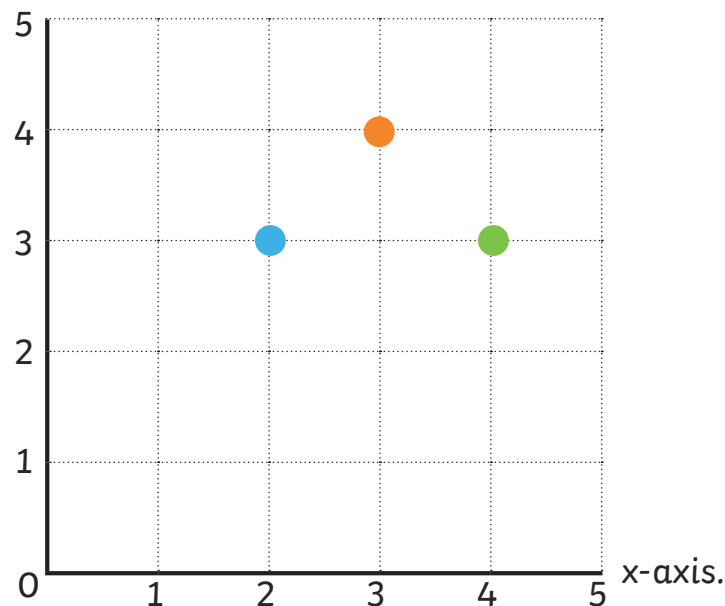
mirror line

translation

horizontal

vertical

y-axis.



Coordinates are a useful way to locate a position on a map or grid.

The numbers across the horizontal line of the grid are on the **x-axis**.

The numbers on the vertical line of the grid are on the **y-axis**.

We always read or write the number on the x-axis before the y-axis.

The x and y position are written in brackets with a comma.

The coordinate of the orange spot is **(3, 4)**.

To help you remember which point to read or write first, simply remember to move 'along the corridor and up the stairs'.

In other words, move on the **x-axis** and then move on the **y-axis**.



## Position and Direction

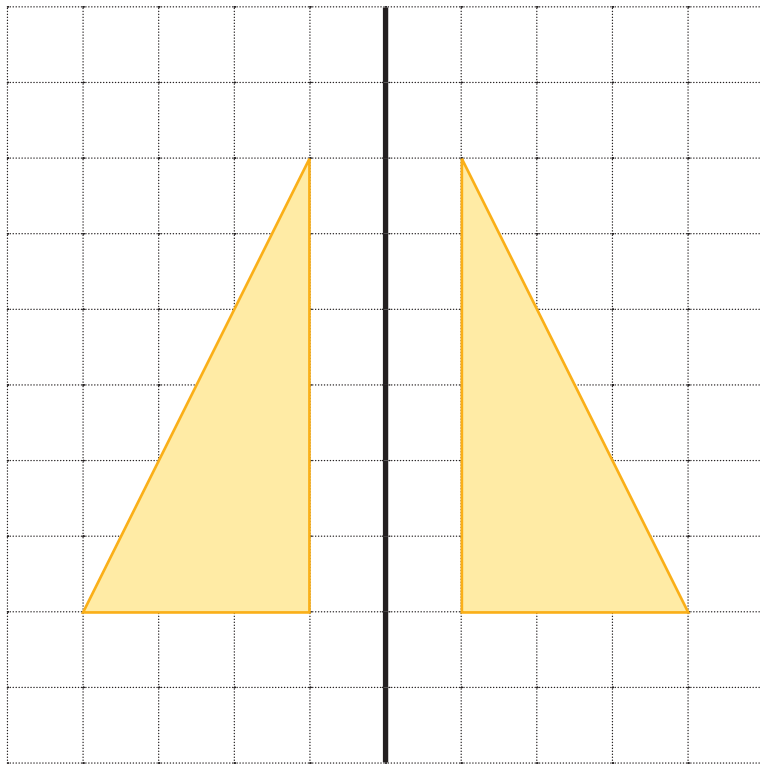
## Knowledge Organiser

### Reflection

A shape is reflected when it is flipped over a mirror line.

The reflected image is congruent to the original. This means that the measurements of the sides and angles have not changed.

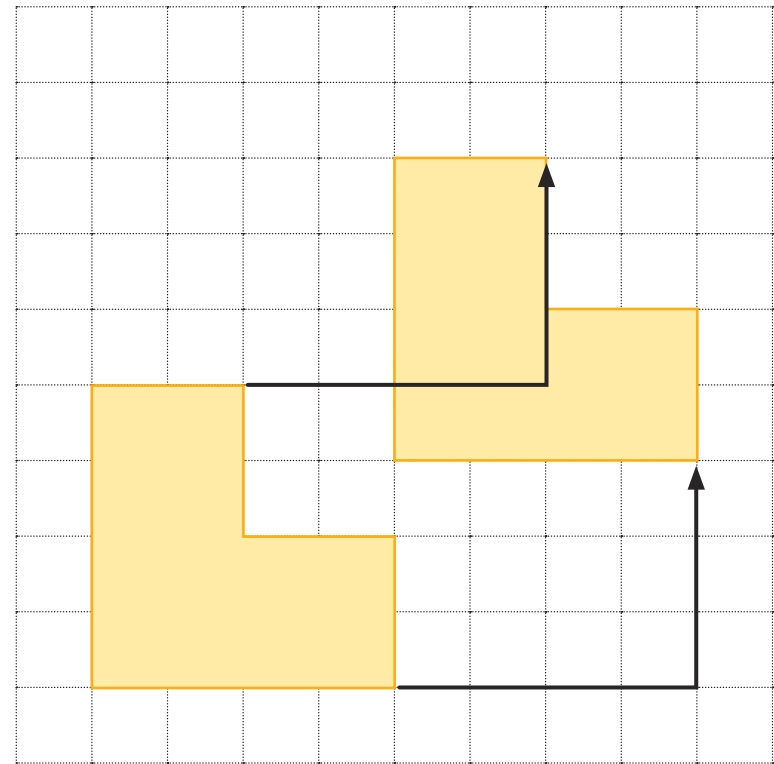
Each point of the reflected shape is the same distance from the mirror line as the original shape.



### Translation

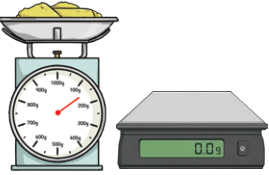
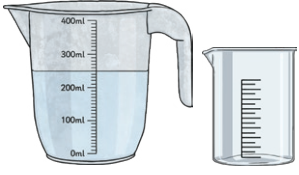

In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.

When translating an object on a grid, it can move up or down, left or right.



# Converting Units

# Knowledge Organiser

Key Vocabulary	Converting Mass	Converting Capacity
mass	 <p> <math>1000\text{g} = 1\text{kg}</math>  <math>\frac{1}{10}\text{kg} = 0.1\text{kg} = 100\text{g}</math>  <math>\frac{1}{4}\text{kg} = 0.25\text{kg} = 250\text{g}</math>  <math>\frac{1}{2}\text{kg} = 0.5\text{kg} = 500\text{g}</math>  <math>\frac{3}{4}\text{kg} = 0.75\text{kg} = 750\text{g}</math> </p> <p> <math>\text{kg} \xrightarrow{\times 1000} \text{g}</math>  <math>\text{g} \xrightarrow{\div 1000} \text{kg}</math> </p>	 <p> <math>1000\text{ml} = 1\text{litre}</math>  <math>\frac{1}{10}\text{l} = 0.1\text{l} = 100\text{ml}</math>  <math>\frac{1}{4}\text{l} = 0.25\text{l} = 250\text{ml}</math>  <math>\frac{1}{2}\text{l} = 0.5\text{l} = 500\text{ml}</math>  <math>\frac{3}{4}\text{l} = 0.75\text{l} = 750\text{ml}</math>  <math>\frac{1}{100}\text{l} = 0.01\text{l} = 10\text{ml}</math> </p> <p> <math>\text{l} \xrightarrow{\times 1000} \text{ml}</math>  <math>\text{ml} \xrightarrow{\div 1000} \text{l}</math> </p>
gram		
kilogram		
capacity		
volume		
millilitre	Converting Length	
centilitre	 <p> <math>\text{km} \xrightarrow{\times 1000} \text{m} \xrightarrow{\times 100} \text{cm} \xrightarrow{\times 10} \text{mm}</math>  <math>\text{mm} \xrightarrow{\div 10} \text{cm} \xrightarrow{\div 100} \text{m} \xrightarrow{\div 1000} \text{km}</math> </p> <p> <math>1000\text{ metres} = 1\text{ kilometre}</math>  <math>100\text{cm} = 1\text{m}</math>  <math>10\text{mm} = 1\text{cm}</math>  <math>\frac{1}{10}\text{km} = 0.1\text{km} = 100\text{m}</math> </p> <p> <math>\frac{1}{4}\text{km} = 0.25\text{km} = 250\text{m}</math>  <math>\frac{1}{2}\text{km} = 0.5\text{km} = 500\text{m}</math>  <math>\frac{3}{4}\text{km} = 0.75\text{km} = 750\text{m}</math> </p>	
litre		
millimetre		
centimetre		
kilometre		

## Units of Time

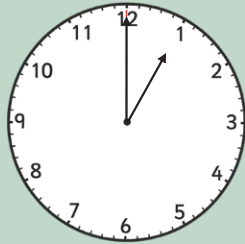
### Minute

1 minute = 60 seconds



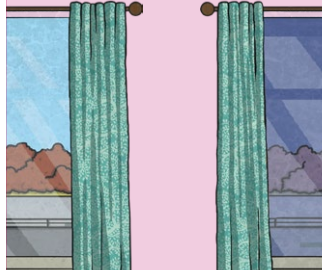
### Hour

1 hour = 60 minutes



### Day

1 day = 24 hours



### Week

1 week = 7 days



### Fortnight

1 fortnight = 2 weeks



### Month

January = 31 days  
 February = 28 days (29 on a leap year)  
 March = 31 days  
 April = 30 days  
 May = 31 days  
 June = 30 days  
 July = 31 days  
 August = 31 days  
 September = 30 days  
 October = 31 days  
 November = 30 days  
 December = 31 days



### Year

1 year =  
 12 months =  
 52 weeks =  
 365 days



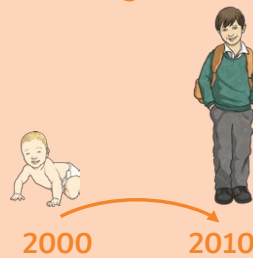
### Leap Year

1 leap year =  
 366 days



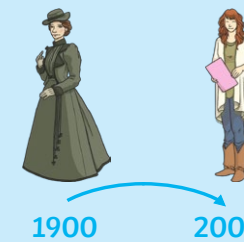
### Decade

1 decade =  
 10 years



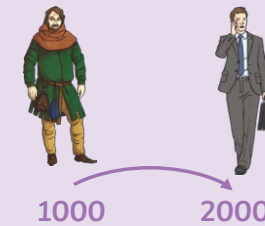
### Century

1 century =  
 100 years



### Millennium

1 millennium =  
 1000 years



## Key Vocabulary

## Volume of Cubes and Cuboids

cubed

area

cross-section

prism

cube

cuboid

face

length

height

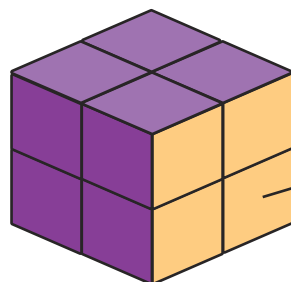
width

depth

Volume is measured in cubed units. For example, **cm<sup>3</sup>**, **m<sup>3</sup>** and **km<sup>3</sup>**.

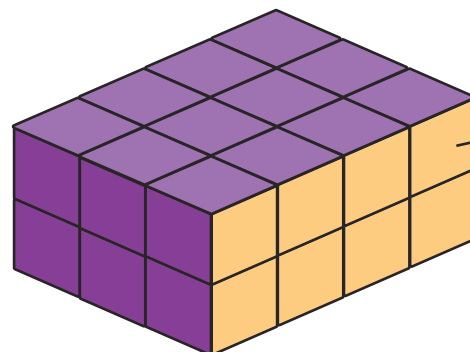
To calculate the volume of cubes and cuboids:

1. Calculate the area of the cross-section (one face).
2. Multiply the area of the cross-section (one face) by its depth.



$$\text{Area of cross section (face)} = 2\text{cm} \times 2\text{cm} = 4\text{cm}^2$$

$$4\text{cm}^2 \times 2\text{cm} = \text{Volume of } 8\text{cm}^3$$



$$\text{Area of cross section (face)} = 4\text{cm} \times 2\text{cm} = 8\text{cm}^2$$

$$8\text{cm}^2 \times 3\text{cm} = \text{Volume of } 24\text{cm}^3$$

