

Key Vocabulary	Counting																									
thousands	Counting in 6s																									
hundreds	0	6	12	18	24	30	36	42	48	54	60															
tens	Counting in 7s																									
ones	0	7	14	21	28	35	42	49	56	63	70															
zero	Counting in 9s																									
place value	0	9	18	27	36	45	54	63	72	81	90															
greater than	Counting in 25s																									
less than	0	25	50	75	100	125	150	175	200	225	250															
order	Counting in 1000s																									
round	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10 000															
rounded to	Compare and Order						1000 More or 1000 Less																			
negative number	<table border="1"> <thead> <tr> <th>Th</th><th>H</th><th>T</th><th>O</th></tr> </thead> <tbody> <tr> <td>●●●</td><td>●●</td><td>●●</td><td>●●●●</td></tr> </tbody> </table>				Th	H	T	O	●●●	●●	●●	●●●●	$4324 > 3243$ greater than		<table border="1"> <thead> <tr> <th>Th</th><th>H</th><th>T</th><th>O</th></tr> </thead> <tbody> <tr> <td>●●●</td><td>●●</td><td>●●●</td><td>●●●</td></tr> </tbody> </table>				Th	H	T	O	●●●	●●	●●●	●●●
Th	H	T	O																							
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Th	H	T	O																							
●●●	●●	●●●	●●●																							
partition					$879 < 2126$ less than																					
digit	<table border="1"> <tr> <td>2497</td><td>2508</td><td>3012</td><td>3521</td><td>3530</td><td>4002</td></tr> </table>						2497	2508	3012	3521	3530	4002														
2497	2508	3012	3521	3530	4002																					
Roman numeral	smallest						greatest																			
	visit twinkl.com																									

Negative Numbers



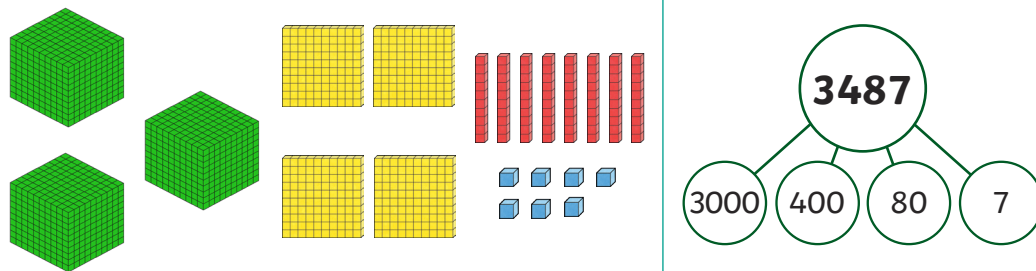
Represent 4-Digit Numbers

3487

three thousand, four hundred and eighty-seven

1000s	100s	10s	1s

Thousands	Hundreds	Tens	Ones



Roman Numerals

one	1	I
five	5	V
ten	10	X
fifty	50	L
one hundred	100	C

XVIII = 18

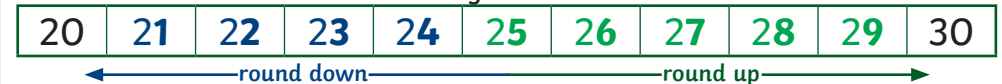
XXIX = 29

LXXXIV = 84

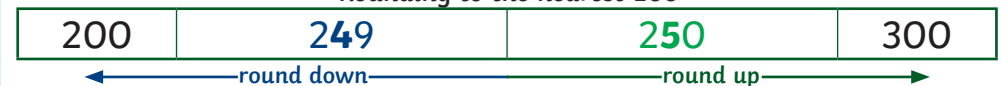
Rounding

Look at the place value column to the right of the value you are rounding to. If this digit is a 4 or less, round down. If the digit is a 5 or more, round up.

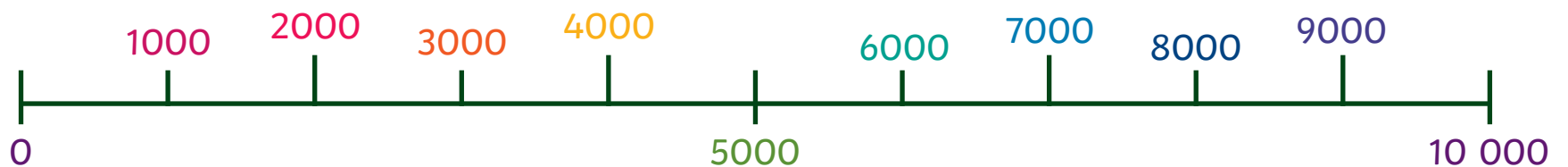
Rounding to nearest 10



Rounding to the nearest 100



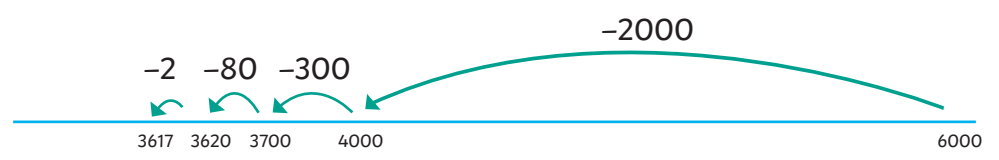
Rounding to the nearest 1000



Key Vocabulary	Addition and Subtraction Methods	
Add	<h3>Add 4-digit numbers</h3> <p>No exchange</p> $\begin{array}{r} 5162 \\ +3427 \\ \hline 8589 \end{array}$ <p>Starting with the ones, add each column in turn.</p> <p>One exchange</p> $\begin{array}{r} 5162 \\ +3497 \\ \hline 8659 \\ 1 \end{array}$ <p>Starting with the ones, add each column in turn. When adding 6 tens + 9 tens = 15 tens = 1 hundred + 5 tens Place 1 hundred under the hundreds answer and 5 tens in the answer.</p> <p>Multiple exchanges</p> $\begin{array}{r} 5864 \\ +3497 \\ \hline 9361 \\ 111 \end{array}$ <p>Starting with the ones, add each column in turn. Exchange tens, hundreds and/ or thousands as required.</p>	<h3>Subtract 4-digit numbers</h3> <p>No exchange</p> $\begin{array}{r} 5789 \\ - 3421 \\ \hline 2368 \end{array}$ <p>Starting with the ones, subtract each column in turn.</p> <p>One exchange</p> $\begin{array}{r} 61 \\ 5749 \\ - 3471 \\ \hline 2278 \end{array}$ <p>Starting with the ones, subtract each column in turn. When subtracting 4 tens - 7 tens, exchange 1 hundred to make: 14 tens - 7 tens = 7 tens</p> <p>Multiple exchanges</p> $\begin{array}{r} 6131 \\ 5742 \\ - 3476 \\ \hline 2266 \end{array}$ <p>Starting with the ones, subtract each column in turn. Exchange tens, hundreds and/ or thousands as required.</p>
Total		
Plus		
Sum		
More		
Altogether		
Difference		
Subtract		
Less		
Minus		
Take away		
Mentally, Orally		
Column Addition		
Column Subtraction		
Exchange		
Estimate		
Inverse operation		
Solve problems		
Number facts		

Efficient subtraction

Calculate 6000 - 3617 = 2383

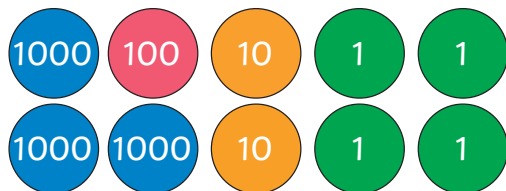


Addition and Subtraction

Knowledge Organiser

Add and Subtract 1s, 10s, 100s, 1000s

Here is the number 3124



Add 2 thousands = 5124

Add 5 hundreds = 5624

Subtract 2 tens = 5604

Add 5 ones = 5609

Here is the number 6708

Thousands	Hundreds	Tens	Ones
6	7	0	8

Add 3 thousands = 9708

Subtract 4 hundreds = 9308

Add 5 tens = 9358

Subtract 7 ones = 9351

Crossing ones, tens or hundreds

5392 + 4 tens = 5432 crossing tens

5126 - 600 = 4526 crossing hundreds

When crossing ones, tens or hundreds, more than one digit will change.



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Round to Estimate

$$1635 + 386 = 2021$$

Round to the nearest ten

$$1640 + 390 = 2030$$

Round to the nearest hundred

$$1600 + 400 = 2000$$

Both give a reasonable estimate, but rounding the nearest ten is more accurate.

$$9362 - 5729 = 3622$$

Round to the nearest hundred

$$9400 - 5700 = 3700$$

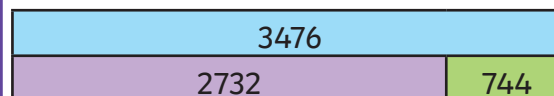
Round to the nearest thousand

$$9000 - 6000 = 3000$$

Rounding to the nearest hundred is much more accurate in this case.

Checking Strategies

Using Inverse



$3476 - 744 = 2732$ can be checked using

$$2732 + 744 = 3476$$

This part whole shows the inverse calculations using these three numbers.



$1549 + 2688 = 4237$	$2688 + 1549 = 4237$
$4237 - 1549 = 2688$	$4237 - 2688 = 1549$

Adding in a different order

$$420 + 372 + 280 =$$

Change to

$$420 + 280 + 372 =$$

$$\text{As } 420 + 280 = 700$$

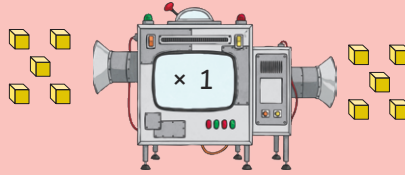
(because $42 + 28 = 70$)

$$420 + 280 + 372 = 700 + 372 = 1072$$

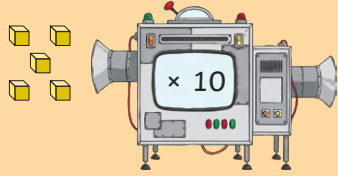
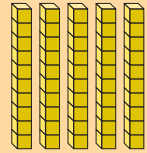
Key Vocabulary Multiplication and Division Facts Use Place Value to Multiply and Divide Mentally

multiply
groups of
lots of
times
divide
share
remainder

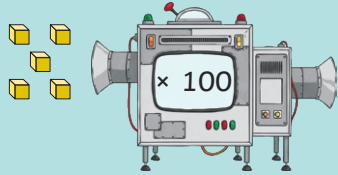
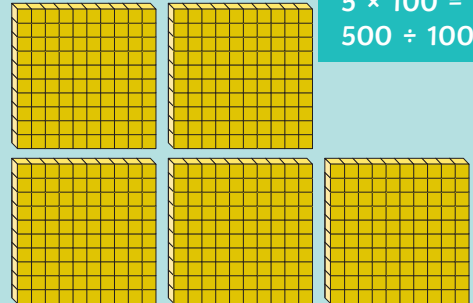
x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144



$5 \times 1 = 5$
 $5 \div 1 = 5$

$5 \times 10 = 50$
 $50 \div 10 = 5$

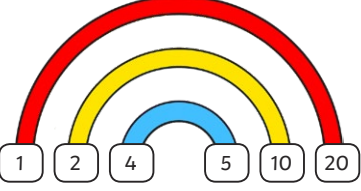



$5 \times 100 = 500$
 $500 \div 100 = 5$

Factor pairs and Commutativity

factor
multiple
product

20




1 2 4 5 10 20

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

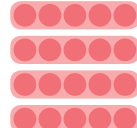
The factor pairs are:

1 and 20	2 and 10	4 and 5
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$5 \times 4 = 20$



$4 \times 5 = 20$



Multiply Using Formal Written Methods

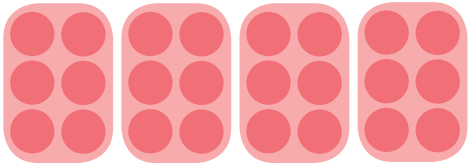
Th	H	T	O	
	5	4	3	
x			4	
		1	2	(4 × 3)
	1	6	0	(4 × 40)
2	0	0	0	(4 × 500)
2	1	7	2	

Th	H	T	O
	5	4	3
x			4
2	1	7	2
	1	1	

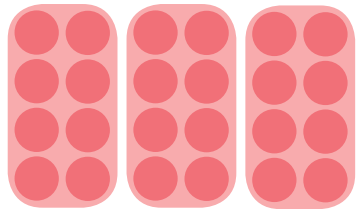
Remember to move any regrouped numbers into the next column. After the next multiplication, add the regrouped number to the answer.

Mental Calculations for Solving Problems

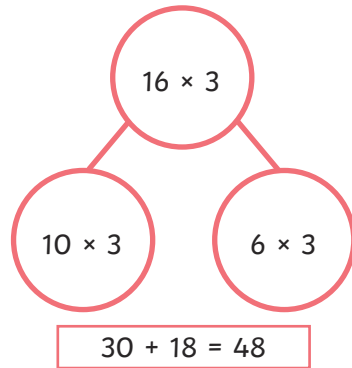
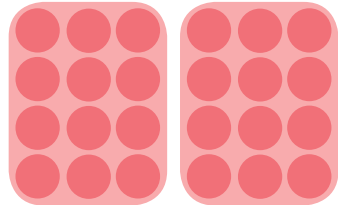
$(2 \times 3) \times 4 = 24$



$(2 \times 4) \times 3 = 24$

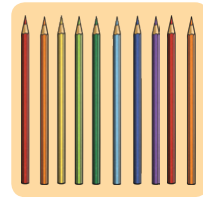


$(3 \times 4) \times 2 = 24$

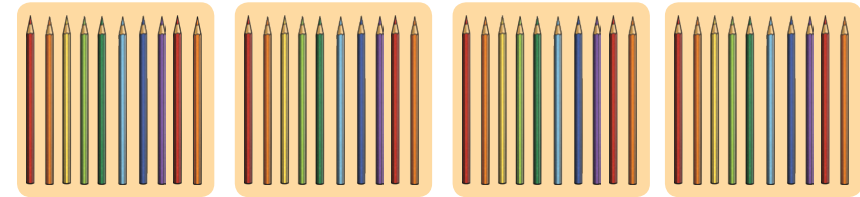


Integer Scaling Problems

10 pencils



$10 \times 4 = 40$ pencils



75g



$75g \times 2 = 150g$



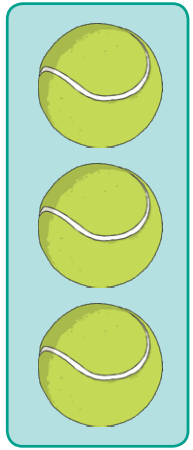
Short Division with Exact Answers

There are 69 tennis balls packed in tubes of 3.
There are 23 tubes altogether.

$69 \div 3 = 23$

$$\begin{array}{r} 23 \\ 3 \overline{) 69} \end{array}$$

69		
23	23	23

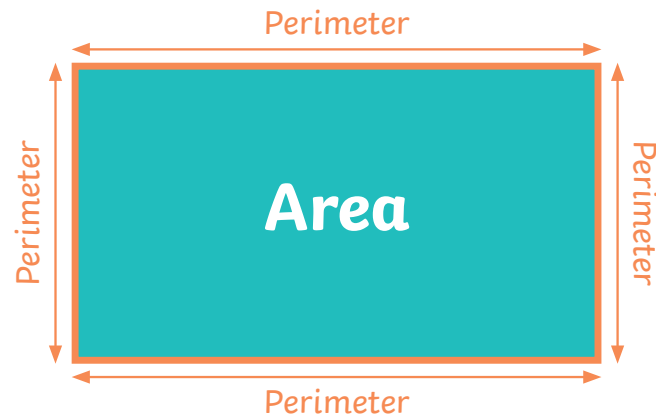


Keywords

- area
- perimeter
- centimetres
- metres
- squares
- distance
- millimetres
- kilometres
- length
- width
- rectilinear
- right angle

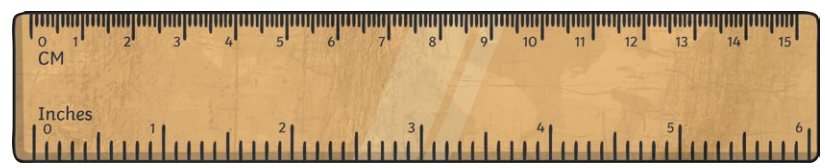
Area and Perimeter

Area is the amount of space inside a 2D shape.
Perimeter is the total **distance** around the outside of a 2D shape.



Units of Measure for Perimeter

- km** 1 kilometre = 1000 metres
- m** 1 metre = 100 centimetres
- cm** 1 centimetre = 10 millimetres
- mm**

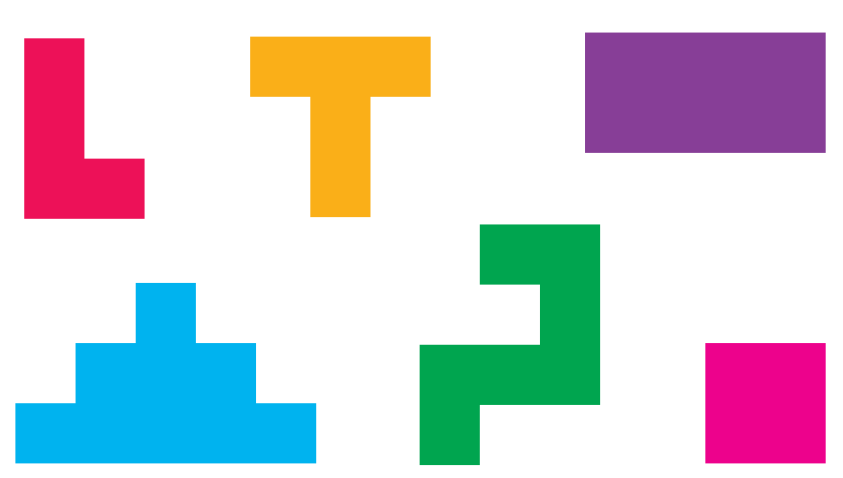


Measuring Area

We can count **squares** to find the **area** of a **rectilinear** shape.

Rectilinear Figures

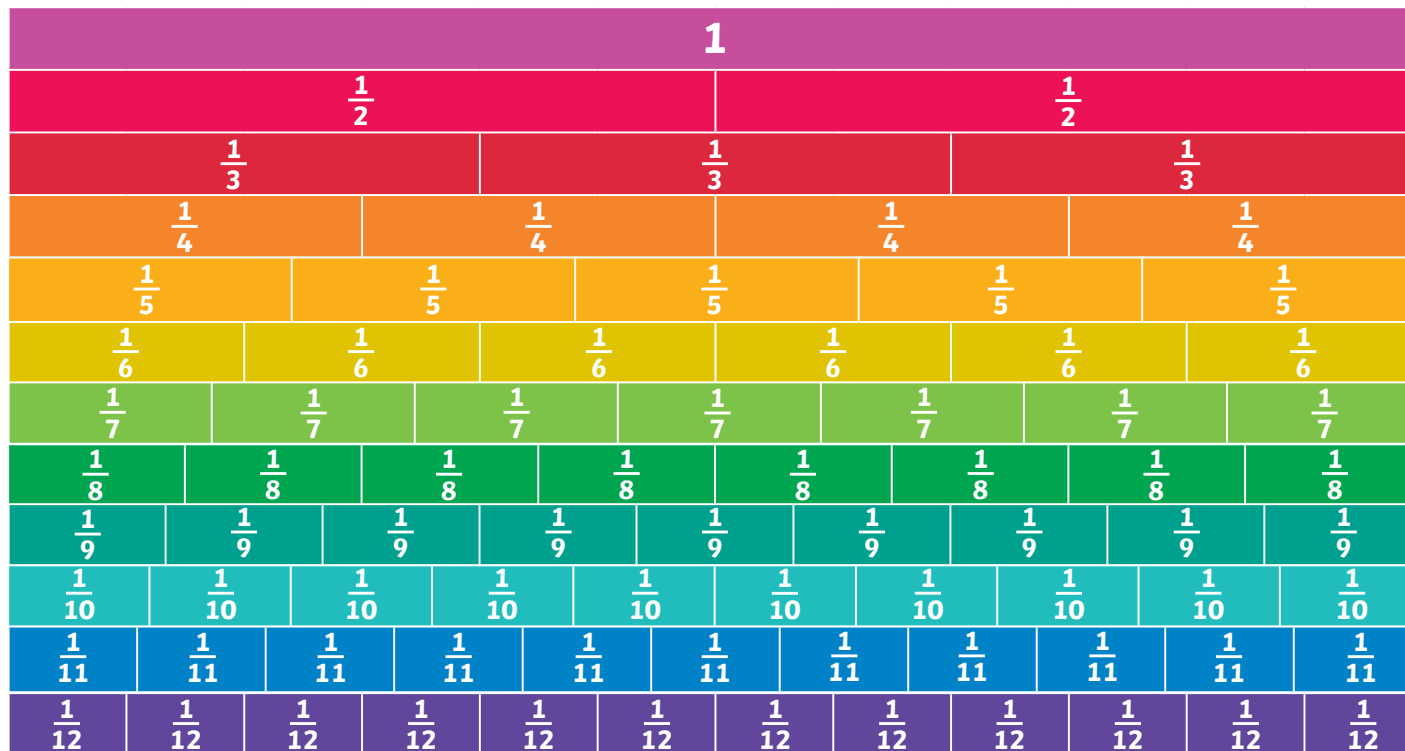
A **rectilinear** figure is a 2D shape whose sides all meet at **right angles** (90°).



Key Vocabulary

Fraction Families

numerator
denominator
unit fraction
non-unit fraction
equivalent
quantities
whole
halves
thirds
quarters
fifths
sixths
sevenths



Key Vocabulary

eighths
ninths
tenths
elevenths
twelfths
quantities

Fractions of Quantities

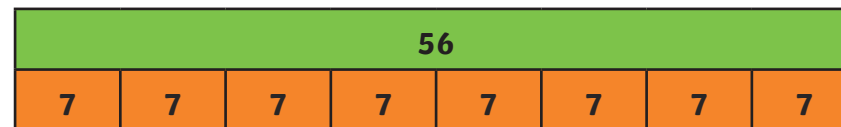
To find a fraction of a number, divide by the denominator and multiply by numerator.

To find quarters of 20:



$\frac{1}{4}$ of 20 = 5 $\frac{2}{4}$ of 20 = 10 $\frac{3}{4}$ of 20 = 15 $\frac{4}{4}$ of 20 = 20

To find eighths of 56:

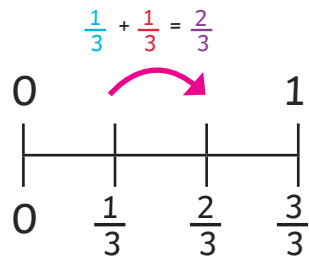


$\frac{1}{8}$ of 56 = 7 $\frac{2}{8}$ of 56 = 14 $\frac{3}{8}$ of 56 = 21 $\frac{4}{8}$ of 56 = 28
 $\frac{5}{8}$ of 56 = 35 $\frac{6}{8}$ of 56 = 42 $\frac{7}{8}$ of 56 = 49 $\frac{8}{8}$ of 56 = 56

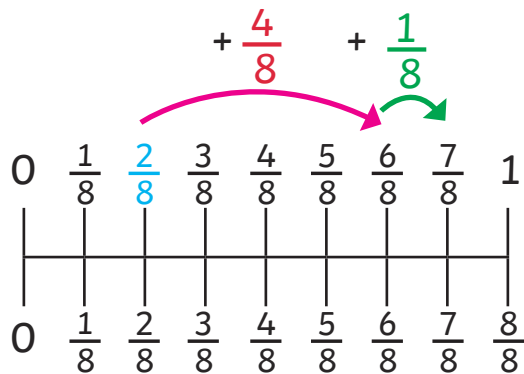
Adding Fractions

Fractions can be added when the denominators are the same.

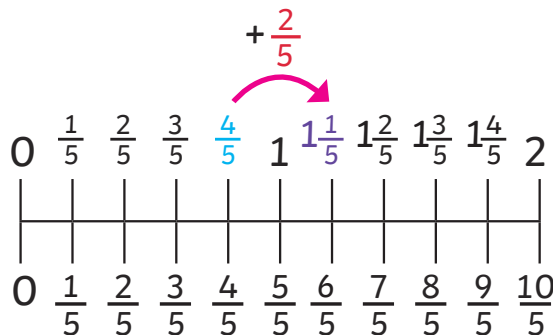
$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$



$$\frac{2}{8} + \frac{4}{8} + \frac{1}{8} = \frac{7}{8}$$



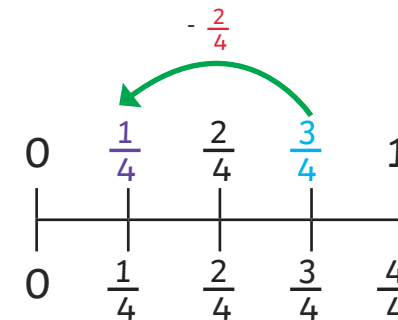
$$\frac{4}{5} + \frac{2}{5} = \frac{6}{5} \text{ or } 1\frac{1}{5}$$



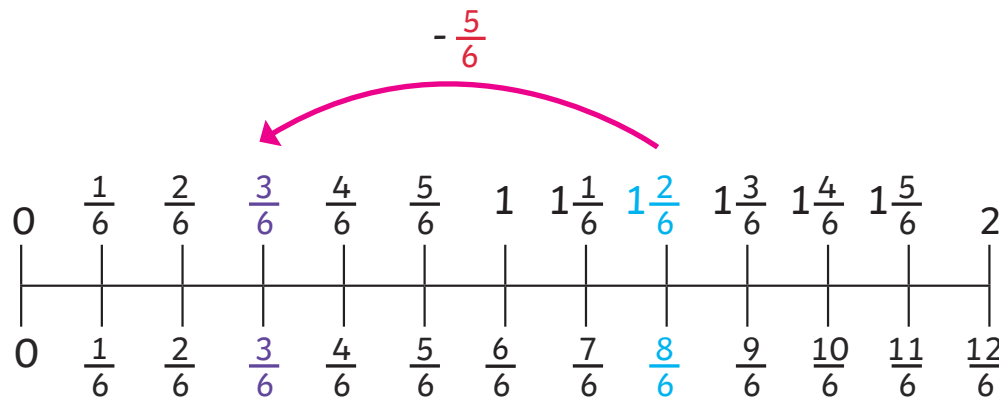
Subtracting fractions

Fractions can be subtracted when the denominators are the same.

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



$$\frac{8}{6} - \frac{5}{6} = \frac{3}{6}$$



Decimals

Knowledge Organiser

Key Vocabulary

tenths

hundredths

decimal tenths

decimal hundredths

decimal equivalents

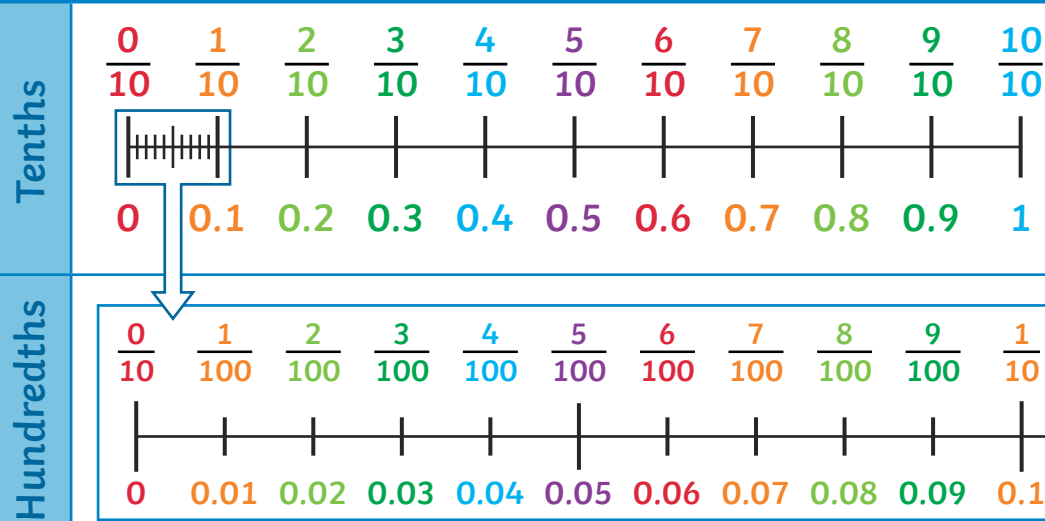
part-whole model

rounding

decimal point

place value

Tenths and Hundredths



Fraction and Decimal Equivalents

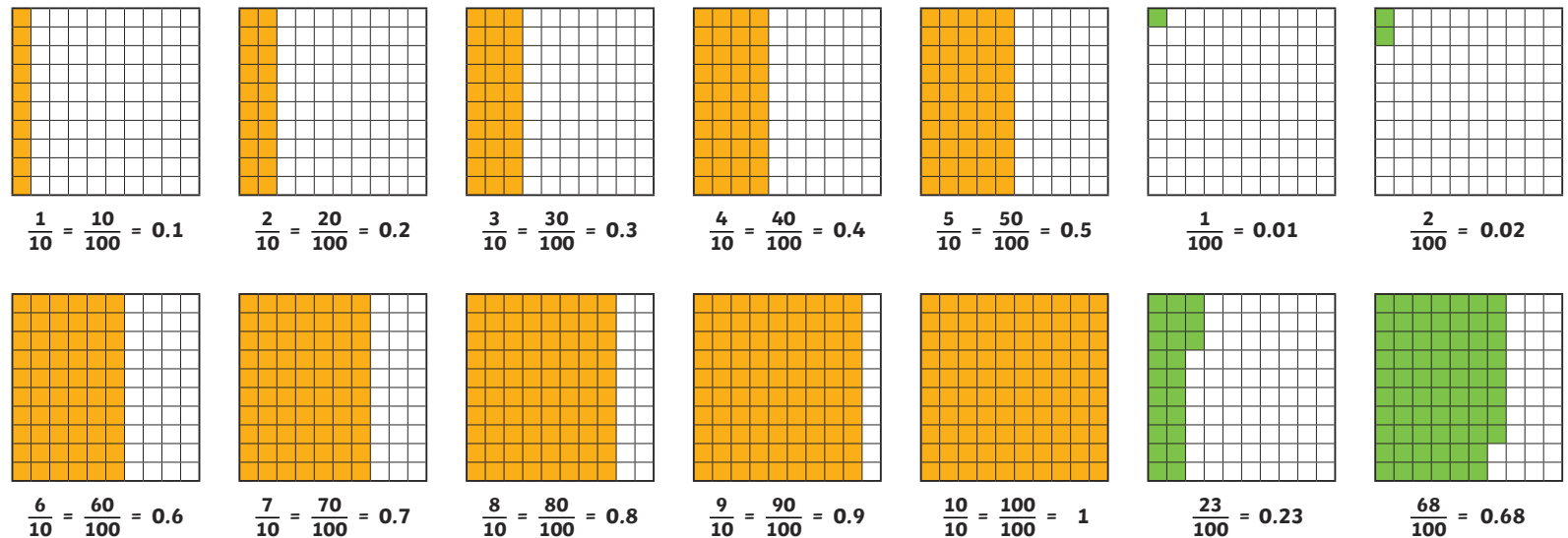
= $\frac{1}{2}$ = 0.5

= $\frac{1}{4}$ = 0.25

= $\frac{3}{4}$ = 0.75

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

Tenth and Hundredth Decimal Equivalents



Dividing by 10

Tens	Ones	$\div 10$
8	5	

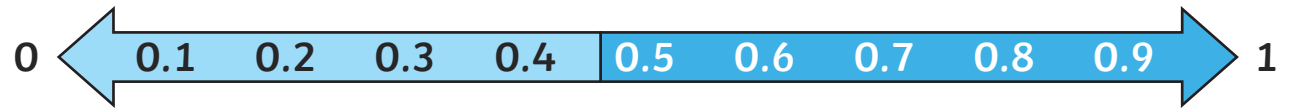
$\div 10$		
Tens	Ones	Tenths
	8	5
		$\div 10$

Dividing by 100

Tens	Ones	$\div 100$
8	5	

$\div 100$			
Tens	Ones	Tenths	Hundredths
	0	8	5
		$\div 100$	

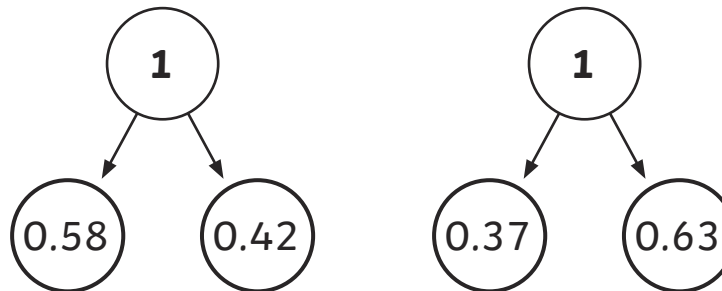
Rounding Decimals



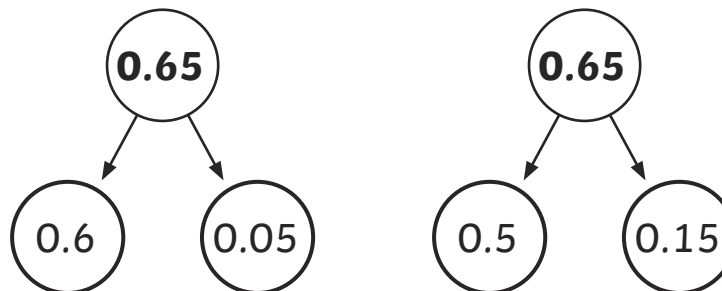
If the tenths digit is **1, 2, 3 or 4**, we round **down** to the nearest whole number.

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

Make a Whole



Partitioning Tenths and Hundredths



Comparing Numbers with Two Decimal Places

Ones	Tenths	Hundredths
0	3	4

0 . 3 4

Ones	Tenths	Hundredths
1	0	2

1 . 0 2

Ones	Tenths	Hundredths
2	1	3

2 . 1 3

Key Vocabulary

amount

change

combinations

estimate

decimal

pence

penny

pounds

round

value

convert

UK Coins



£0.01

one

penny coin



£0.02

two

pence coin



£0.05

five

pence coin



£0.10

ten

pence coin



£0.20

twenty

pence coin



£0.50

fifty

pence coin



£1.00

one

pound coin



£2.00

two

pound coin

UK Notes



£5

five pound note



£10

ten pound note



£20

twenty pound note



£50

fifty pound note

Pounds and Pence



£3 and 25 pence

£3.25



£52 and 13 pence

£52.13

463 = £4.63

705p = £7.05

92p = £0.92

Ordering Money

We can compare or order amounts by changing all amounts to either pounds or pence.

£4.82 428p

£4.82 = 482p
 482p > 428p
£4.82 > 428p


Order in ascending order:

516p 156p £1.65 £6.51

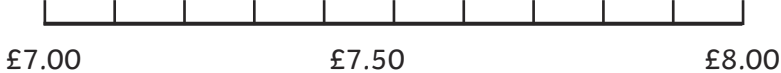

£1.65 = 165p and £6.51 = 651p

156p, £1.65, 516p, £6.51

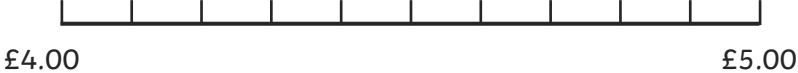
Estimating Money



That's about £8.

That's about £4.



We can use estimates when calculating.

They are about £3 and £7 so will be about £10 in total.





They are about £4 and £3 so will be about £7 in total. I will have about £3 left.

Key Vocabulary

12-hour time

24-hour time

Roman numerals

analogue

digital

hours

minutes

seconds

o'clock

half past

quarter past

quarter to

midday

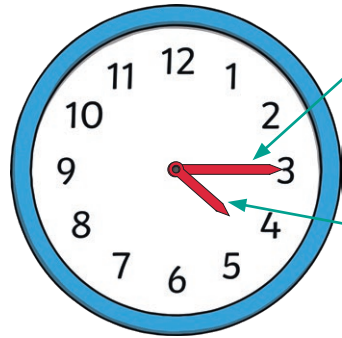
midnight

noon

a.m.

p.m.

Analogue and Digital Clocks

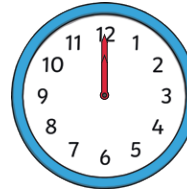


Minute Hand

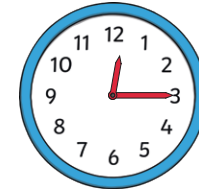
The long hand points to the minutes past the hour.

Hour Hand

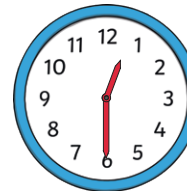
The short hand points to the hour. If this hand is pointing between the hours, it is the earlier hour of the two.



twelve o'clock



quarter past twelve

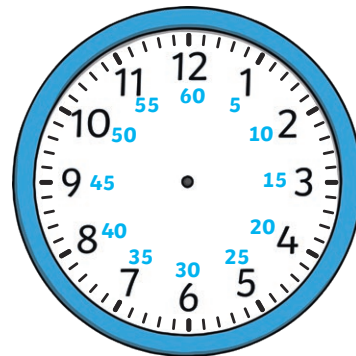


half past twelve



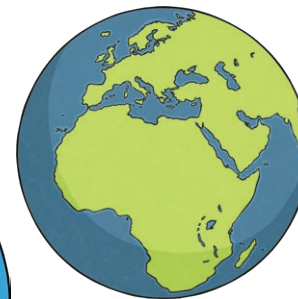
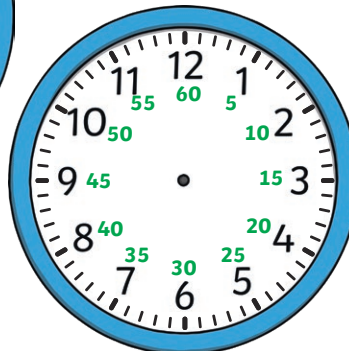
quarter to one

Durations of Time



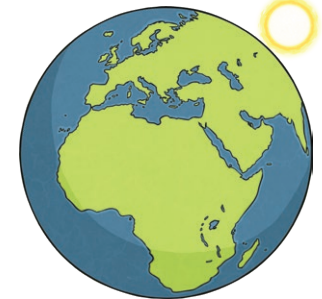
There are **60 seconds** in a minute.

There are **60 minutes** in an hour.



There are **24 hours** in a day

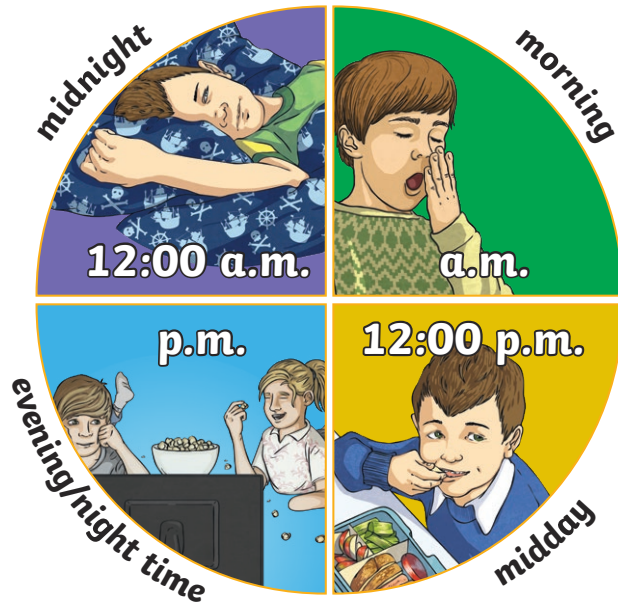
There are **7 days** in a week.



There are **12 months** in a year.

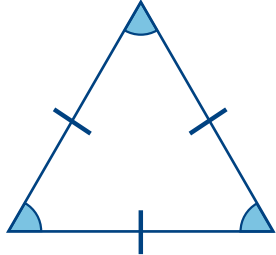
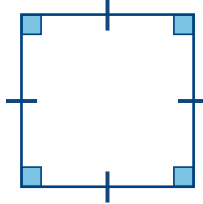
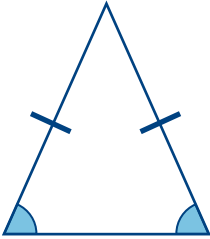
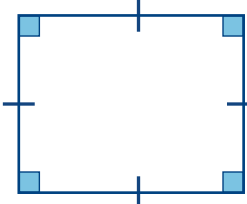
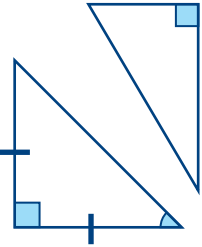
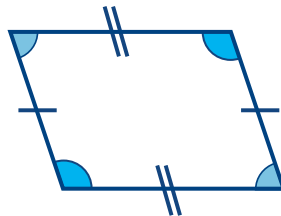
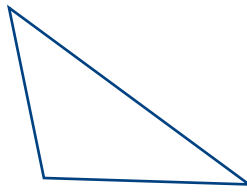
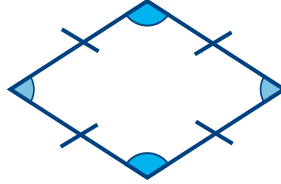
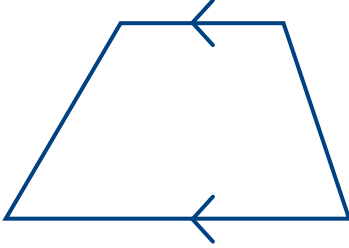
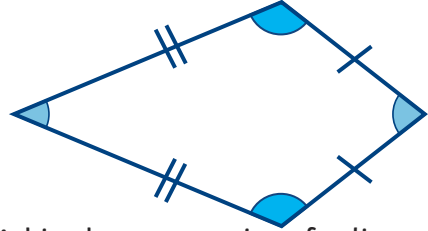
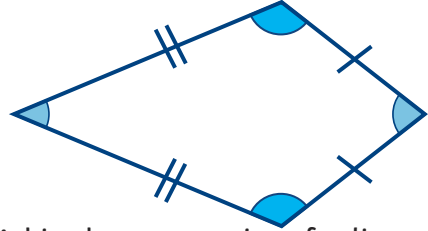
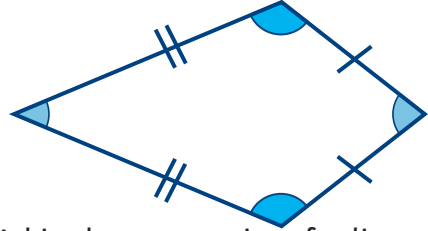
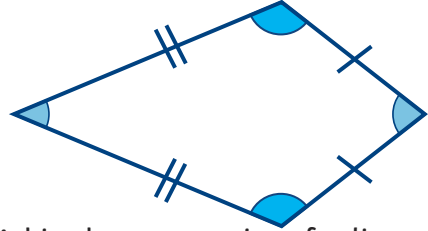
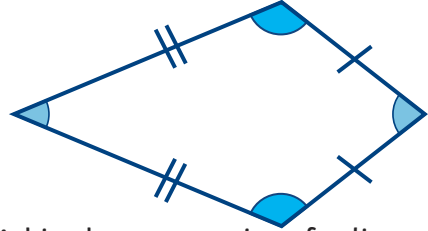
24-Hour Time

There are 24 hours
in a day.



	01:00	1 a.m.	1 o'clock	
	02:00	2 a.m.	2 o'clock	
	03:00	3 a.m.	3 o'clock	
	04:00	4 a.m.	4 o'clock	
	05:00	5 a.m.	5 o'clock	
	06:00	6 a.m.	6 o'clock	
	07:00	7 a.m.	7 o'clock	
	08:00	8 a.m.	8 o'clock	
	09:00	9 a.m.	9 o'clock	
	10:00	10 a.m.	10 o'clock	
	11:00	11 a.m.	11 o'clock	
	12:00	12 p.m.	12 o'clock	

	13:00	1 p.m.	1 o'clock	
	14:00	2 p.m.	2 o'clock	
	15:00	3 p.m.	3 o'clock	
	16:00	4 p.m.	4 o'clock	
	17:00	5 p.m.	5 o'clock	
	18:00	6 p.m.	6 o'clock	
	19:00	7 p.m.	7 o'clock	
	20:00	8 p.m.	8 o'clock	
	21:00	9 p.m.	9 o'clock	
	22:00	10 p.m.	10 o'clock	
	23:00	11 p.m.	11 o'clock	
	00:00	12 a.m.	12 o'clock	

Key Vocabulary	Triangles	Quadrilaterals											
angle	<p>Triangles have 3 sides and 3 vertices. The total of the angles in a triangle is 180°.</p>  <p>An equilateral triangle is a regular polygon. It has sides of equal length and each angle is 60°.</p>	<p>A quadrilateral is a polygon with four sides.</p> 											
right angle		<p>An isosceles triangle has two sides of equal length and two angles of equal size.</p> 	<p>A square has four sides of equal length and four right angles (90°). A square is also a rectangle, a rhombus and a parallelogram.</p> 										
acute			<p>A right-angled triangle always has one 90° angle. It can be isosceles or scalene.</p> 	<p>A parallelogram has two pairs of parallel, equal sides and opposite equal angles.</p> 									
obtuse				<p>A scalene triangle has no equal sides or angles.</p> 	<p>A rhombus has four sides of equal length and opposite equal angles. A rhombus is also a parallelogram.</p> 								
horizontal					<p>A trapezium only has one pair of opposite parallel sides.</p> 	<p>A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.</p> 							
vertical						<p>A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.</p> 							
diagonal								<p>A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.</p> 					
parallel										<p>A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.</p> 			
perpendicular												<p>A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.</p> 	
two-dimensional													
polygon													
line of symmetry													
reflection													
mirror line													
isosceles													
equilateral													
scalene													
quadrilateral													
rhombus													
parallelogram													
trapezium													

Angles

An angle is created when two straight lines meet at a point or intersect.

Right angle

The intersection of perpendicular lines creates a right angle.



Acute angle

Any angle measuring more than 0 degrees and less than 90 degrees is acute.



Obtuse angle

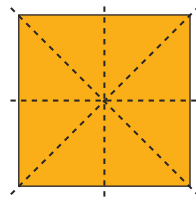
Any angle measuring more than 90 degrees but less than 180 degrees is obtuse.



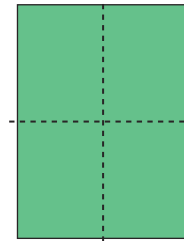
Lines of Symmetry

Lines of symmetry may be horizontal, vertical or diagonal. Some 2D shapes will have no lines of symmetry and some 2D shapes will have multiple lines of symmetry.

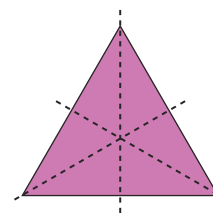
A square has four lines of symmetry.



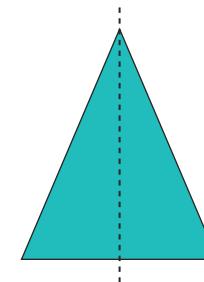
A rectangle has two lines of symmetry.



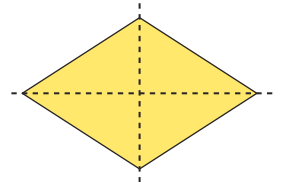
An equilateral triangle has three lines of symmetry.



An isosceles triangle has one line of symmetry.

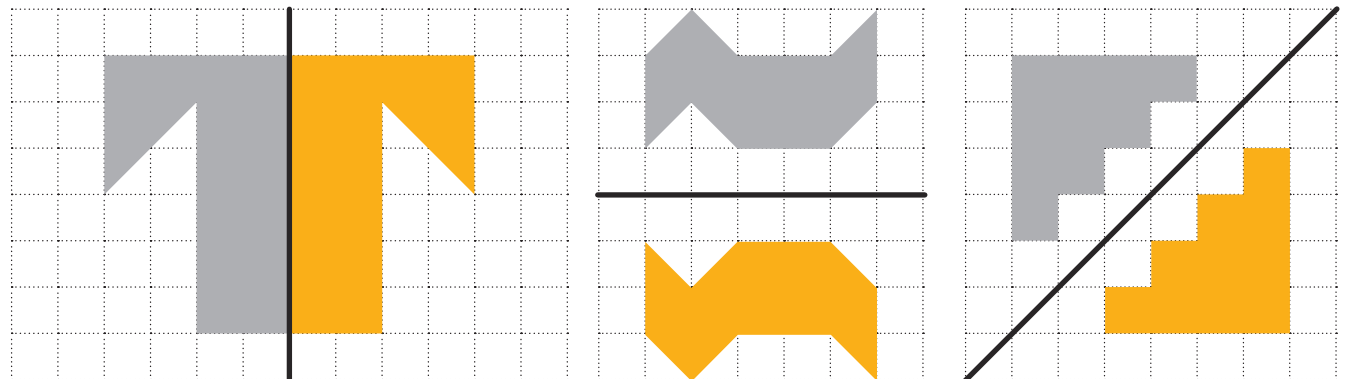


A rhombus has two lines of symmetry.



Symmetric Figures

Patterns and shapes can be reflected in a mirror line. Mirror lines can be vertical, horizontal or diagonal.



Key Vocabulary

bar chart

pictogram

frequency table

tally chart

discrete data

continuous data

time graph

sum

difference

comparison

interpret



Discrete and Continuous Data

Data that is counted in whole numbers is discrete. In **discrete data**, values between whole numbers cannot be counted.

Data that is measured and therefore can take on infinite values is continuous. In **continuous data**, values between whole numbers can be counted.

Frequency Tables

Tally marks are used to help count things. Each vertical line represents one unit. The fifth tally mark goes down across the first four to make it easier to count.

The frequency column is completed after all the data has been collected.

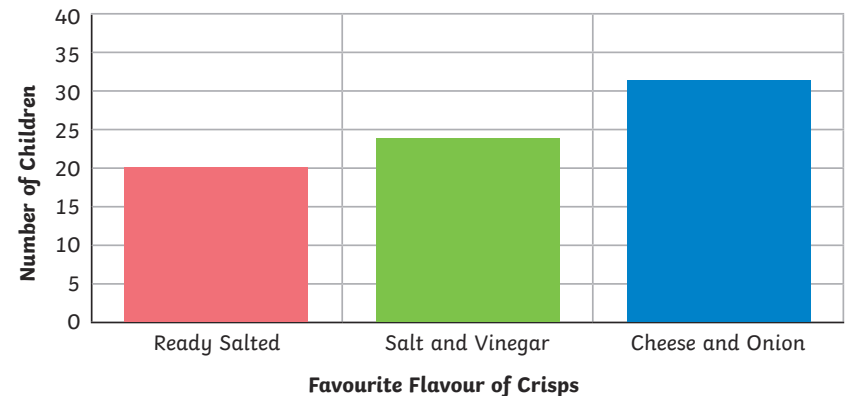
Eye Colour	Tally	Frequency
brown		6
blue		8
green		3
grey		4
hazel		5

Bar Charts

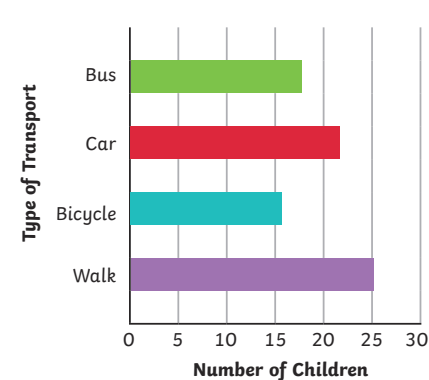
A bar chart has a horizontal axis and a vertical axis. Bars are used to show the data of each category. There must be a gap between each bar.

The scale of the bar chart is based on the range of data.

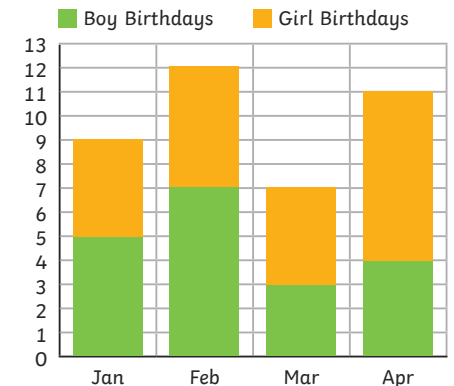
The scale on this bar chart counts in fives.



The bars are horizontal on this bar chart.

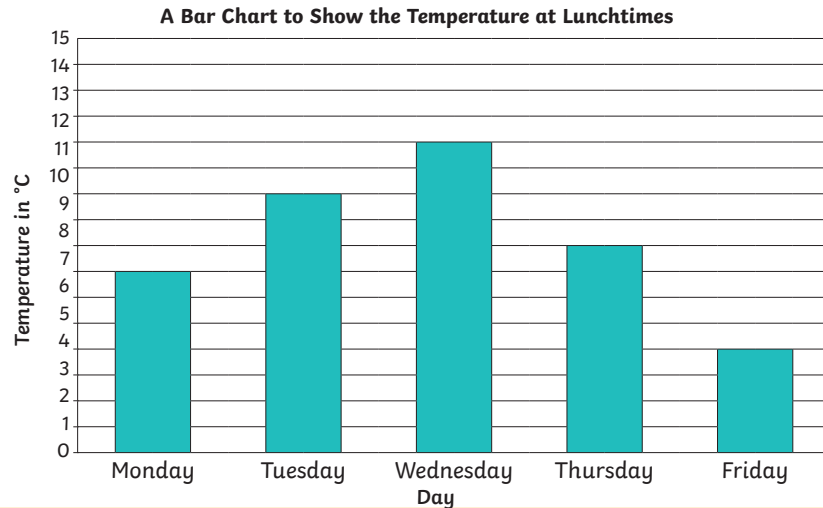


Two sets of data are shown on this stacked bar chart.

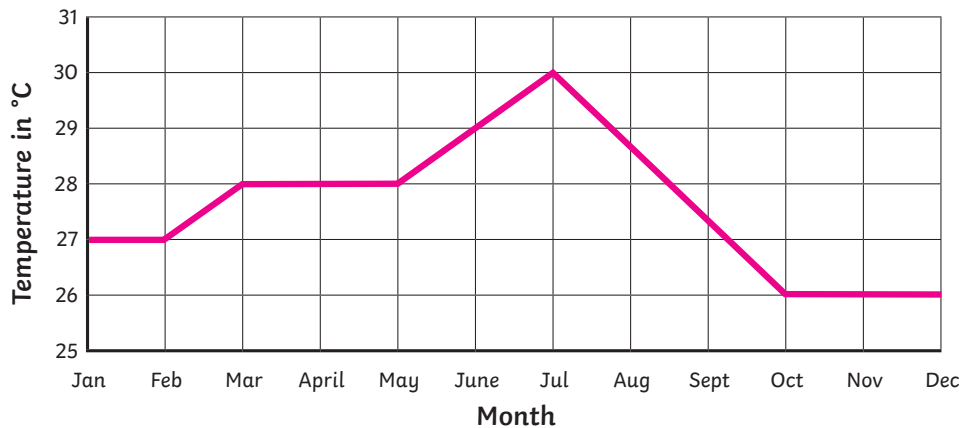


Time Graphs

Time graphs show how data changes over time.



A Line Graph to Show the Average Monthly Temperature in the Borneo Rainforest



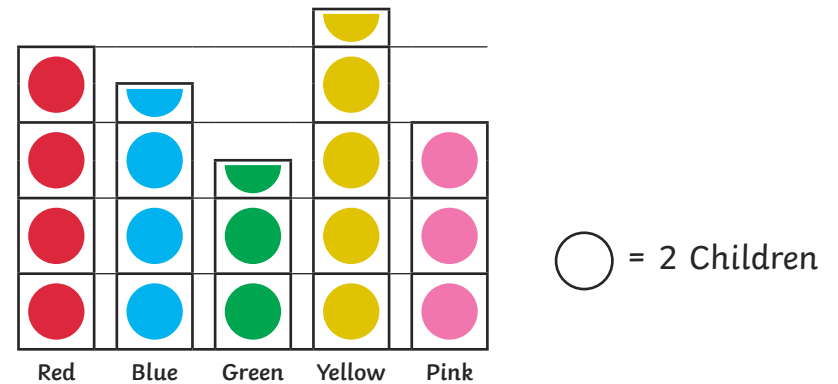
Pictograms

Pictograms use symbols or pictures to represent data.

This pictogram uses one symbol to represent two children.

Using this key, we can see that seven children prefer the colour blue.

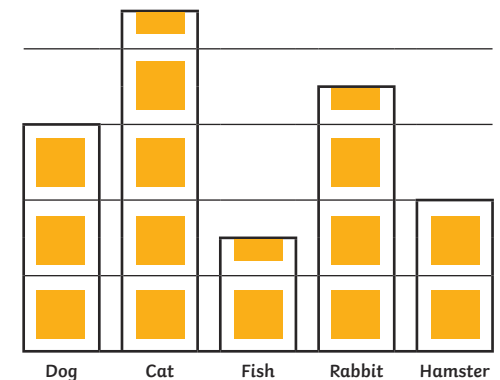
Class 10's Favourite Colours



Class 10's Pets

This pictogram uses one picture to represent four children. Using this key, we can see that six children have a pet fish.

= 4 Children



Key Vocabulary

Position in the First Quadrant

coordinate

quadrant

x-axis

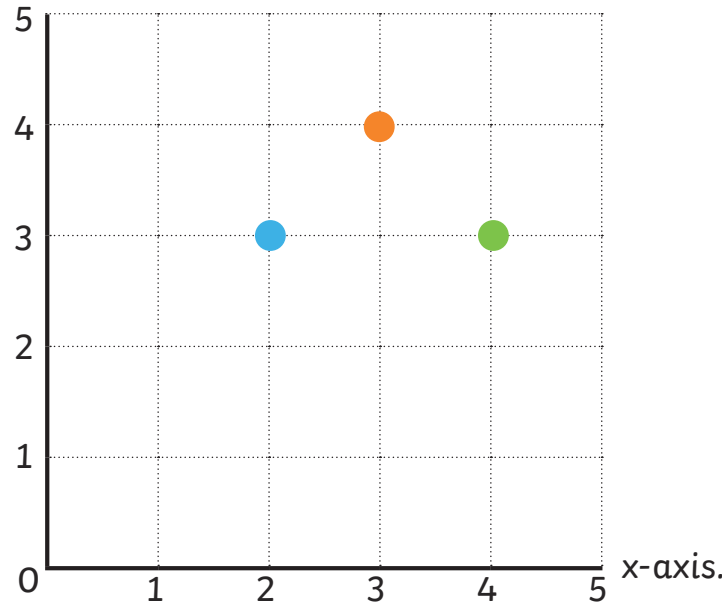
y-axis

translation

vertex

vertices

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 blue spot is **(2, 3)**.

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

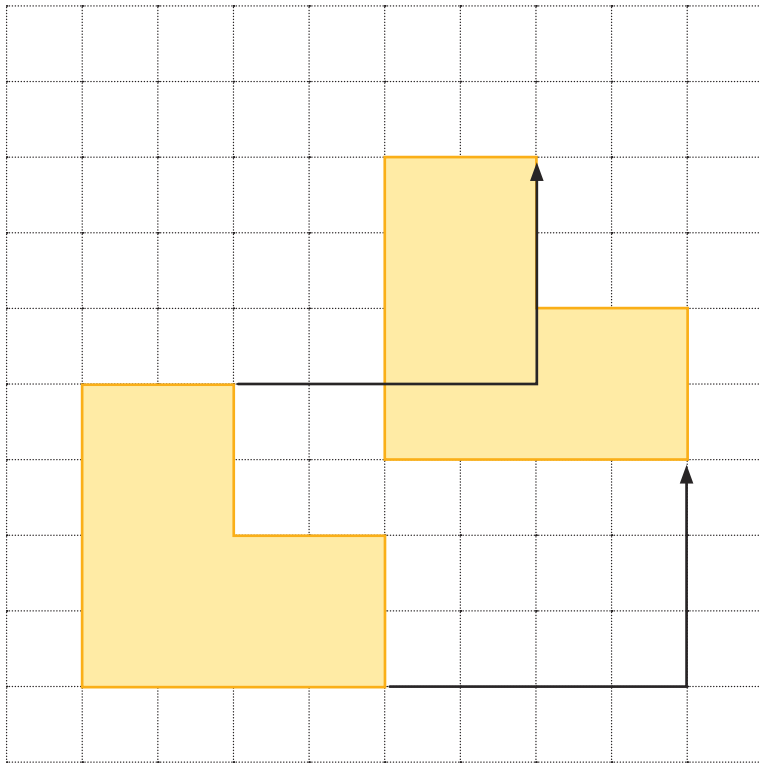
In other words, move on the x-axis and then move on the y-axis.



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.



Plotting 2D Shapes

Each vertex (corner) of a 2D polygon can be represented as a coordinate on a 2D grid.

