

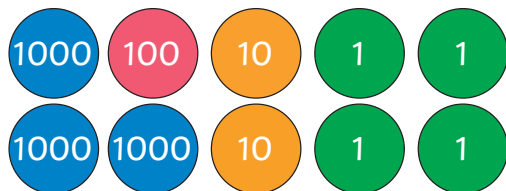
Key Vocabulary	Addition and Subtraction Methods	
Add	Add 4-digit numbers	
Total	No exchange	
Plus	5162 +3427 8589 Starting with the ones, add each column in turn.	
Sum	One exchange	
More	5162 +3497 8659 1 Starting with the ones, add each column in turn. When adding 6 tens + 9 tens = 15 tens = 1 hundred + 5 tens Place 1 hundred under the hundreds answer and 5 tens in the answer.	
Altogether	Multiple exchanges	
Difference	5864 +3497 9361 111 Starting with the ones, add each column in turn. Exchange tens, hundreds and/ or thousands as required.	
Subtract	Subtract 4-digit numbers	
Less	No exchange	
Minus	5789 - 3421 2368 Starting with the ones, subtract each column in turn.	
Take away	One exchange	
Mentally, Orally	61 5749 - 3471 2278 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	
Column Addition	Multiple exchanges	
Column Subtraction	6131 5742 - 3476 2266 Starting with the ones, subtract each column in turn. Exchange tens, hundreds and/ or thousands as required.	
Exchange	Efficient subtraction	
Estimate	3617 3620 3700 4000 6000 Calculate 6000 - 3617 = 2383	
Inverse operation		
Solve problems		
Number facts		
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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

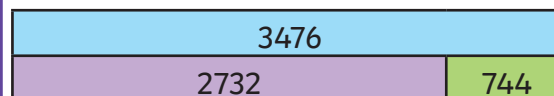
$$9000 - 6000 = 3000$$

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 $42 + 28 = 70$)

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

Area and Perimeter

Knowledge Organiser

Keywords

Area and Perimeter

Measuring Area

area

Area is the amount of space inside a 2D shape.

perimeter

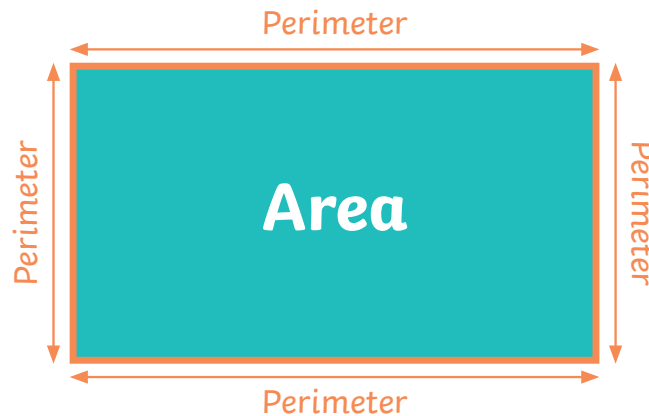
Perimeter is the total **distance** around the outside of a 2D shape.

centimetres

metres

squares

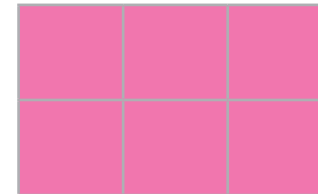
distance



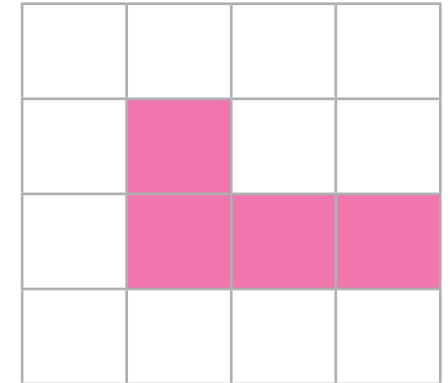
We can count **squares** to find the **area** of a **rectilinear** shape.



Area = 1 square



Area = 6 squares



Area = 4 squares

millimetres

Units of Measure for Perimeter

Rectilinear Figures

kilometres

km

1 **kilometre** = 1000 **metres**

length

m

1 **metre** = 100 **centimetres**

width

cm

1 **centimetre** = 10 **millimetres**

mm

rectilinear

right angle

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



Decimals

Knowledge Organiser

Key Vocabulary

tenths

hundredths

decimal tenths

decimal hundredths

decimal equivalents

part-whole model

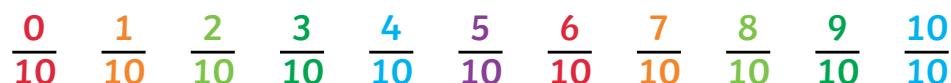
rounding

decimal point

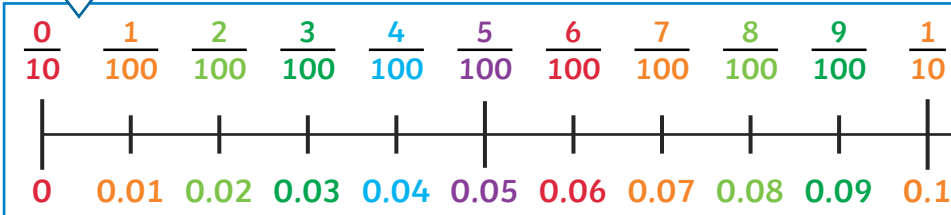
place value

Tenths and Hundredths

Tenths



Hundredths



Fraction and Decimal Equivalents

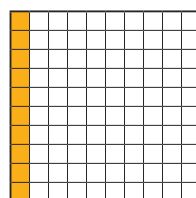
$$\frac{1}{2} = 0.5$$

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

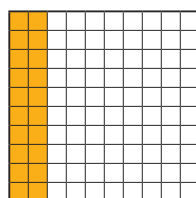
$$\frac{3}{4} = 0.75$$

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

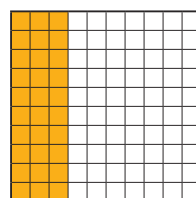
Tenth and Hundredth Decimal Equivalents



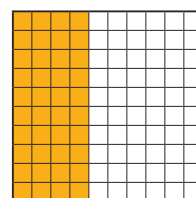
$$\frac{1}{10} = \frac{10}{100} = 0.1$$



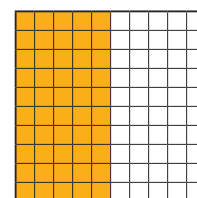
$$\frac{2}{10} = \frac{20}{100} = 0.2$$



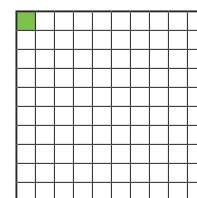
$$\frac{3}{10} = \frac{30}{100} = 0.3$$



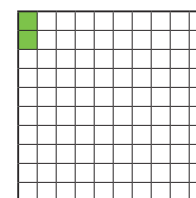
$$\frac{4}{10} = \frac{40}{100} = 0.4$$



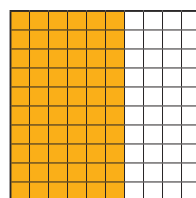
$$\frac{5}{10} = \frac{50}{100} = 0.5$$



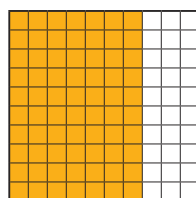
$$\frac{1}{100} = 0.01$$



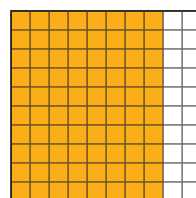
$$\frac{2}{100} = 0.02$$



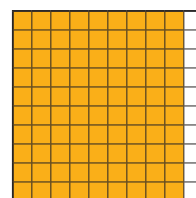
$$\frac{6}{10} = \frac{60}{100} = 0.6$$



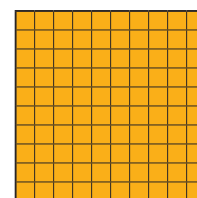
$$\frac{7}{10} = \frac{70}{100} = 0.7$$



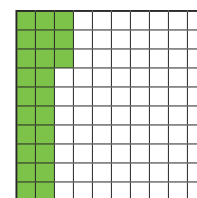
$$\frac{8}{10} = \frac{80}{100} = 0.8$$



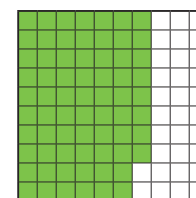
$$\frac{9}{10} = \frac{90}{100} = 0.9$$



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



$$\frac{23}{100} = 0.23$$



$$\frac{68}{100} = 0.68$$

Decimals

Knowledge Organiser

Dividing by 10

Tens	Ones
8	5

 $\div 10$

Tens	Ones	Tenths
	8	5

Arrows indicate the movement of digits: 8 moves from Ones to Tenths ($\div 10$), and 5 moves from Tenths to Hundredths ($\div 10$).

Dividing by 100

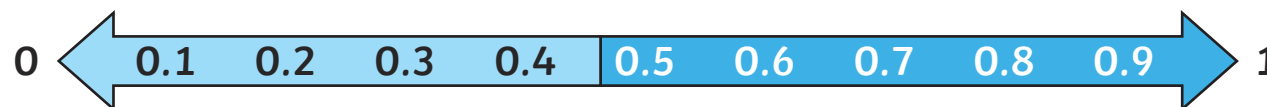
Tens	Ones
8	5

 $\div 100$

Tens	Ones	Tenths	Hundredths
	0	8	5

Arrows indicate the movement of digits: 8 moves from Ones to Hundredths ($\div 100$), and 5 moves from Tenths to Hundredths ($\div 100$).

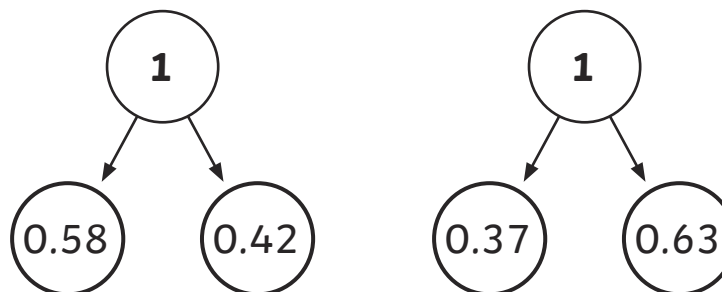
Rounding Decimals



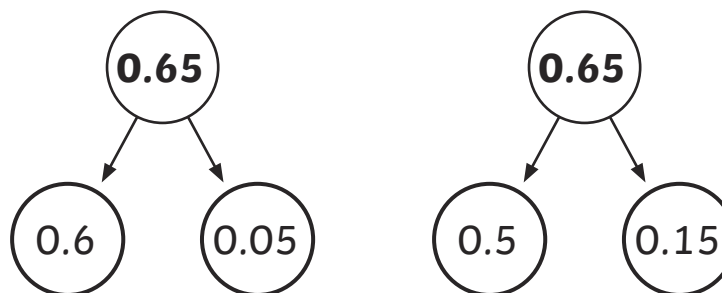
If the tenths digit is **1, 2, 3 or 4**, we round **down** to the nearest whole number.

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

Visual representation: 0.34. The tenths place has 3 yellow circles (1/10 each) and the hundredths place has 4 green circles (1/100 each).

Ones	Tenths	Hundredths
1	0	2

Visual representation: 1.02. The ones place has 1 red circle (1) and the hundredths place has 2 green circles (1/100 each).

Ones	Tenths	Hundredths
2	1	3

Visual representation: 2.13. The ones place has 2 red circles (1 each) and the tenths place has 1 yellow circle (1/10). The hundredths place has 3 green circles (1/100 each).

Key Vocabulary

Fraction Families

numerator

denominator

unit fraction

non-unit fraction

equivalent

quantities

whole

halves

thirds

quarters

fifths

sixths

sevenths

eighths

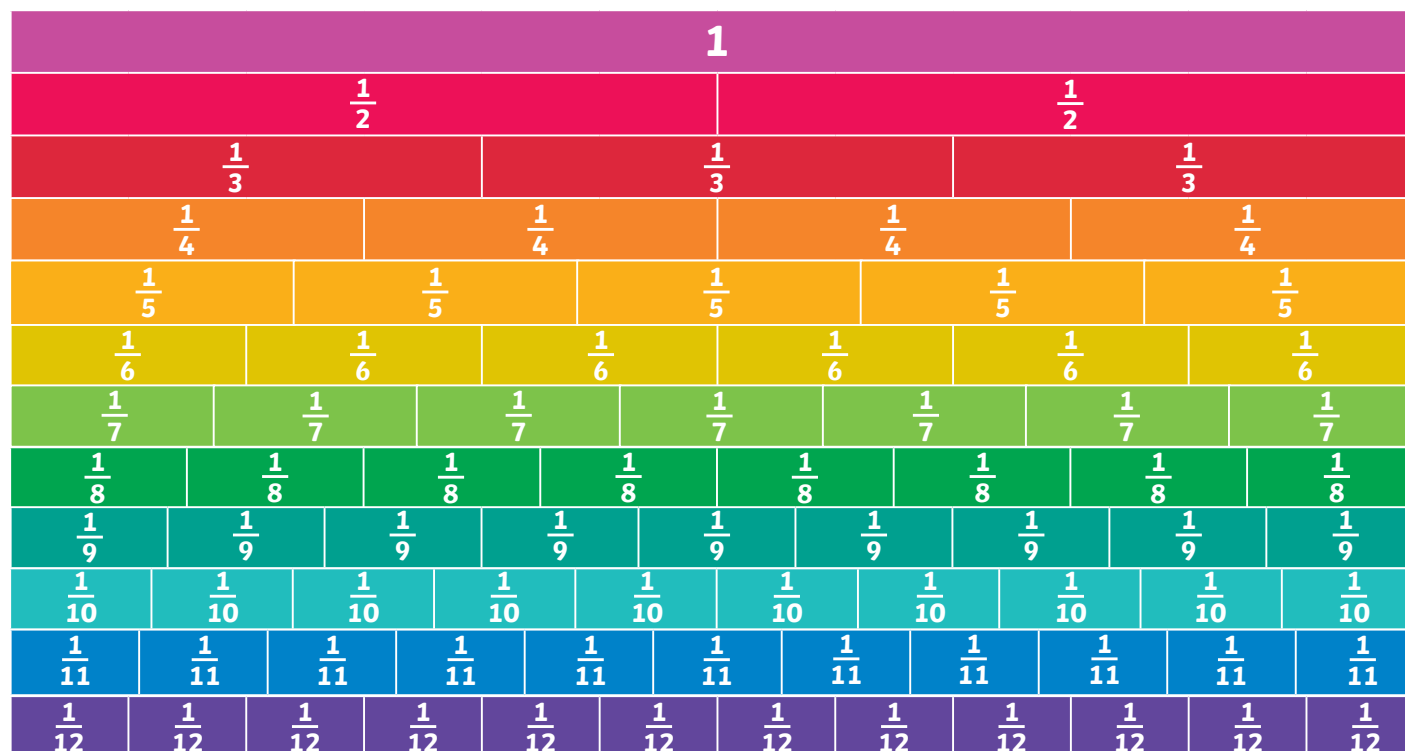
ninths

tenths

elevenths

twelfths

quantities



Fractions of Quantities

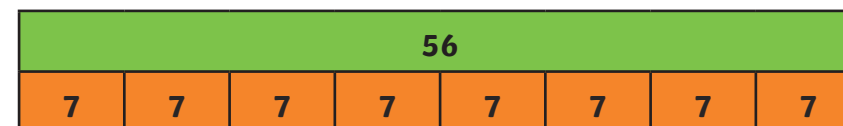
To find a fraction of a number, divide by the denominator and multiply by numerator.

To find quarters of 20:



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

To find eighths of 56:

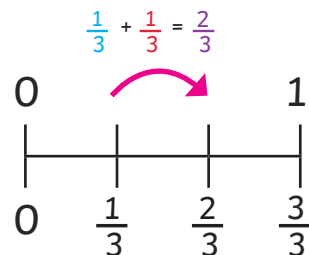


$$\begin{array}{llll} \frac{1}{8} \text{ of } 56 = 7 & \frac{2}{8} \text{ of } 56 = 14 & \frac{3}{8} \text{ of } 56 = 21 & \frac{4}{8} \text{ of } 56 = 28 \\ \frac{5}{8} \text{ of } 56 = 35 & \frac{6}{8} \text{ of } 56 = 42 & \frac{7}{8} \text{ of } 56 = 49 & \frac{8}{8} \text{ of } 56 = 56 \end{array}$$

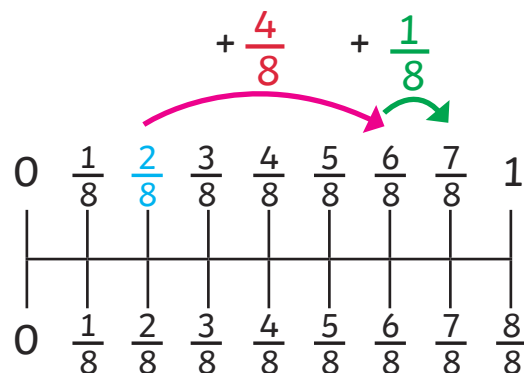
Adding Fractions

Fractions can be added when the denominators are the same.

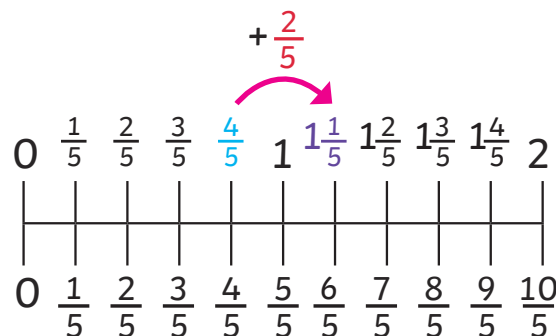
$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$



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



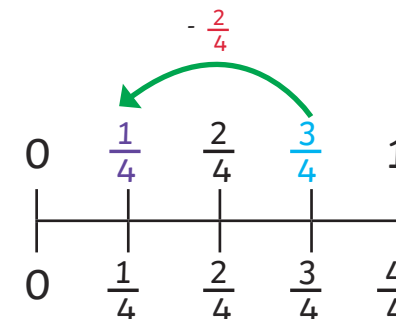
$$\frac{4}{5} + \frac{2}{5} = \frac{6}{5} \text{ or } 1\frac{1}{5}$$



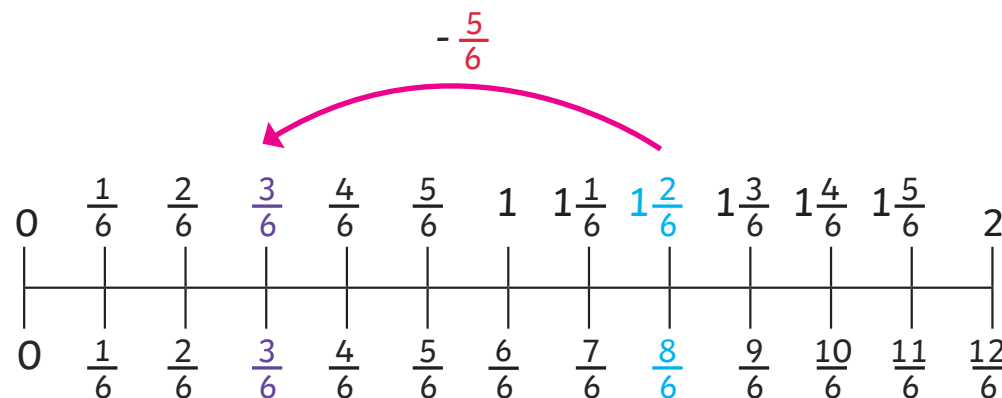
Subtracting fractions

Fractions can be subtracted when the denominators are the same.

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



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



Statistics

Knowledge Organiser

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.

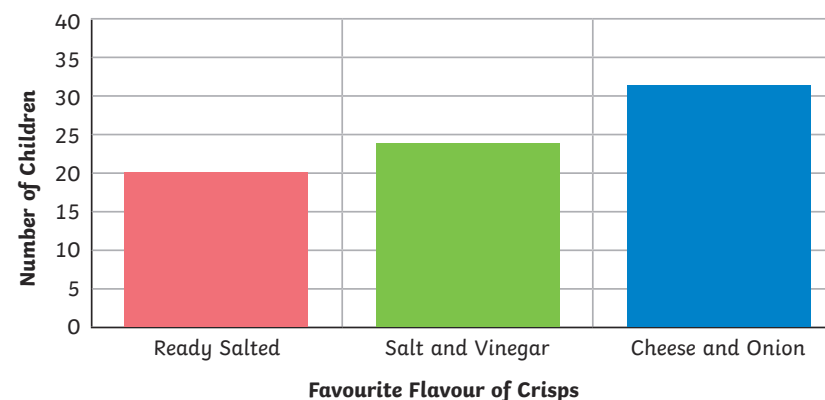
Eye Colour	Tally	Frequency
brown		6
blue		8
green		3
grey		4
hazel		5

Bar Charts

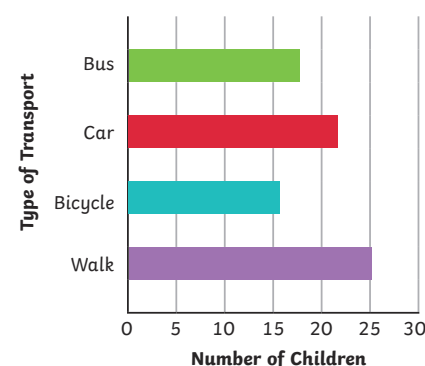
A bar chart has a horizontal axis and a vertical axis. Bars are used to show the data of each category. There must be a gap between each bar.

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

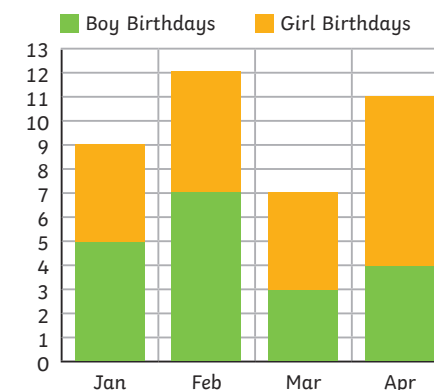
The scale on this bar chart counts in fives.



The bars are horizontal on this bar chart.

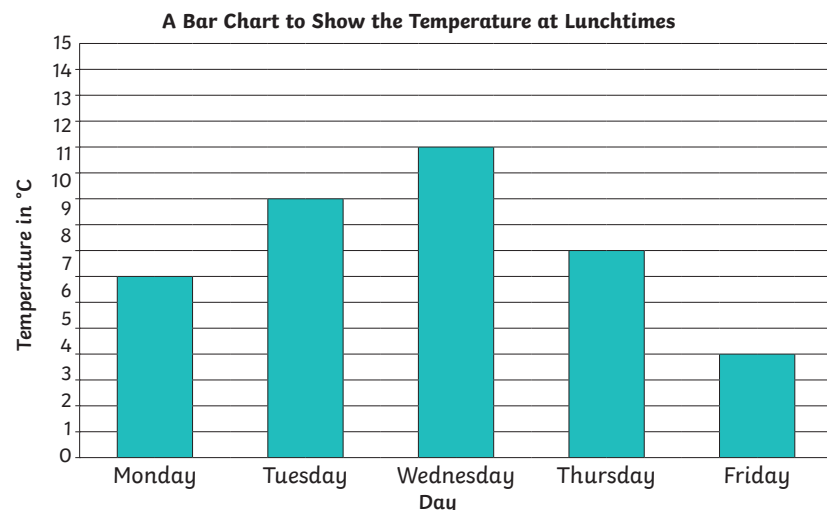


Two sets of data are shown on this stacked bar chart.

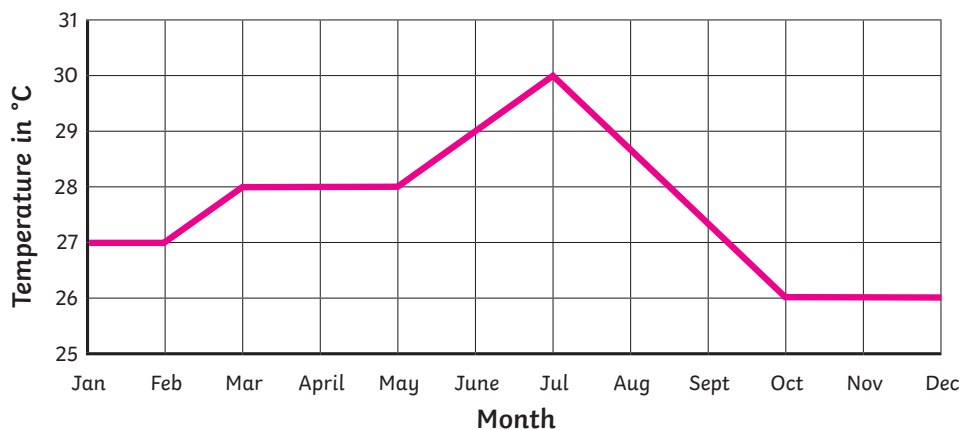


Time Graphs

Time graphs show how data changes over time.



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



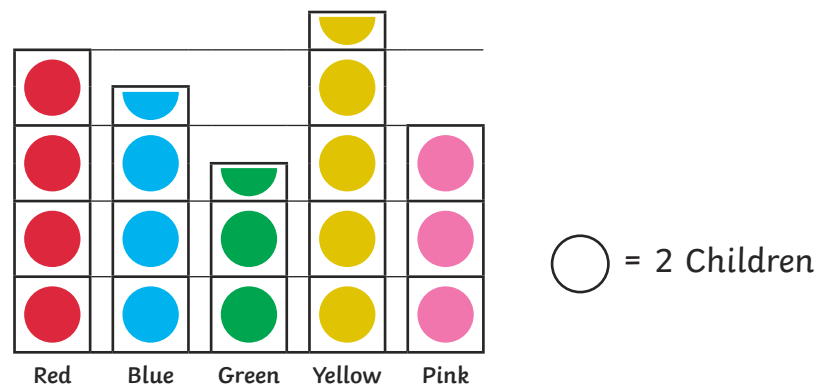
Pictograms

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.

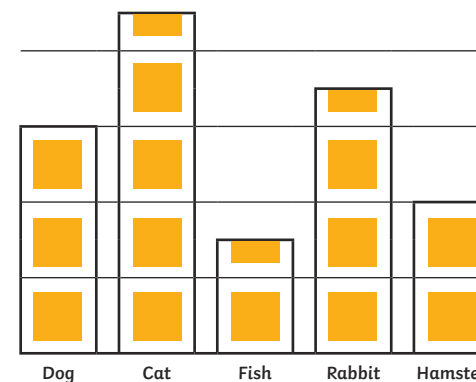
Class 10's Favourite Colours



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



Banknote Reproduction Conditions

All conditions relate to:

- The reproduction of all or part of a banknote;
- Whether the front or the back of a banknote is reproduced;
- For reproductions of all banknotes issued by the Bank of England whether current legal tender or not;
- For all possible reproductions, including modified or distorted reproductions.

Reproduction Conditions		Physical Reproductions	Digital/Other Reproductions
1.	Reproductions must be one sided only.	Required	Not Required
2.	Reproductions must not be the same size as actual banknotes; they must be at least 25% smaller or at least 25% larger.	Required	Not Required
3.	Reproductions may not appear in an offensive or inappropriate context or in such a manner that the Bank, in its sole opinion, believes would undermine the integrity of the currency.	Required	Required
4.	There should be no distortion to the Queen's image (apart from an enlargement, reduction or slant).	Required	Required
5.(a)	Reproductions must be printed on a material clearly different and distinguishable from materials used to print current series Bank of England banknotes.	At least one of conditions 5 (a)-(c) must also be met	Not Required
5.(b)	Reproductions showing more than 50% of the total surface area of one side must be overprinted with the word "SPECIMEN" unless on a slant of over 20 °. SPECIMEN markings must be in bold grey font, at a 45 ° slant through the centre of the banknote, not less than 1/3 the length and 1/10 the height of the note.		At least one of conditions 5 (b)-(c) must also be met
5.(c)	Reproductions showing less than 50% of the total surface area of one side do not need to be slanted or overprinted with the word "SPECIMEN".		

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

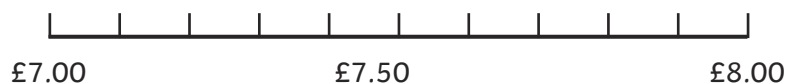
$$£1.65 = 165p \text{ and } £6.51 = 651p$$

156p, £1.65, 516p, £6.51

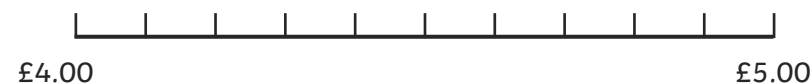
Estimating Money



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.

Multiplication and Division

Knowledge Organiser

Key Vocabulary

Multiplication and Division Facts

Use Place Value to Multiply and Divide Mentally

multiply

groups of

lots of

times

divide

share

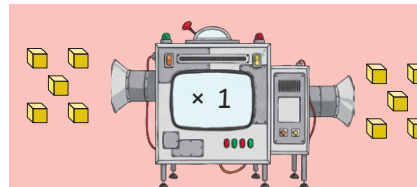
remainder

factor

multiple

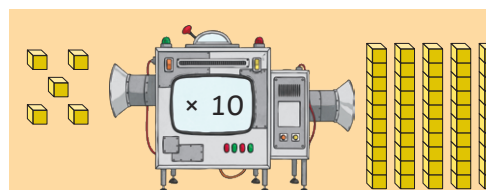
product

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



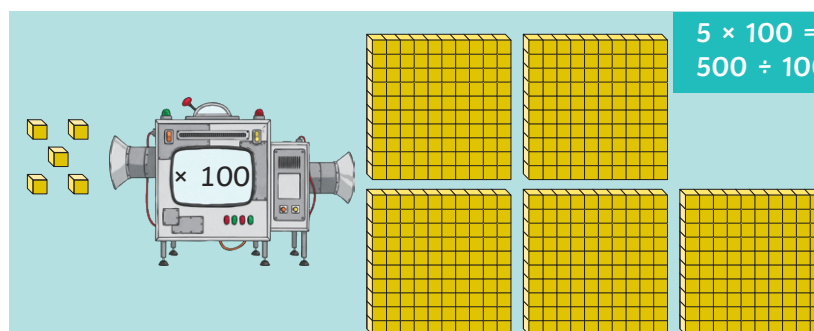
$$5 \times 1 = 5$$

$$5 \div 1 = 5$$



$$5 \times 10 = 50$$

$$50 \div 10 = 5$$

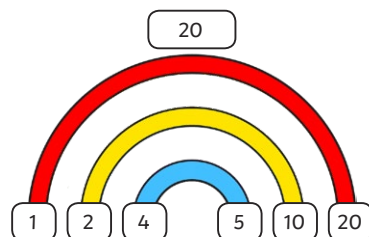


$$5 \times 100 = 500$$

$$500 \div 100 = 5$$

Factor pairs and Commutativity

Multiply Using Formal Written Methods



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

$$5 \times 4 = 20$$

$$4 \times 5 = 20$$

Th	H	T	O
	5	4	3
x			4
		1	2
	1	6	0
2	0	0	0
2	1	7	2

$$(4 \times 3)$$

$$(4 \times 40)$$

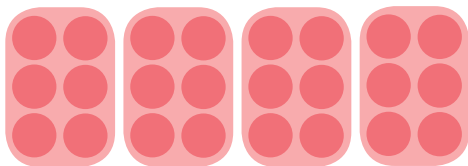
$$(4 \times 500)$$

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

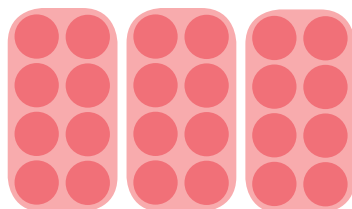
Remember to move any regrouped numbers into the next column. After the next multiplication, add the regrouped number to the answer.

Mental Calculations for Solving Problems

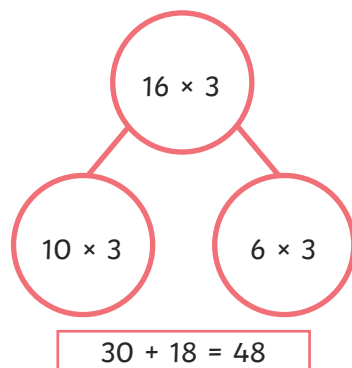
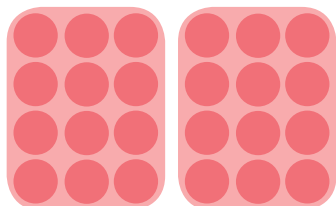
$$(2 \times 3) \times 4 = 24$$



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

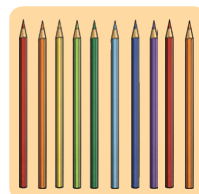


$$(3 \times 4) \times 2 = 24$$

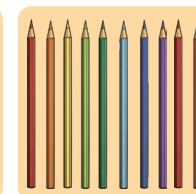
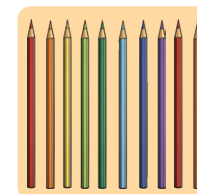
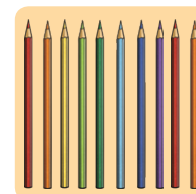
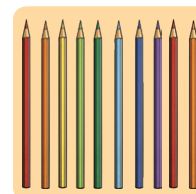


Integer Scaling Problems

10 pencils



$10 \times 4 = 40$ pencils



75g



$75\text{g} \times 2 = 150\text{g}$



Short Division with Exact Answers

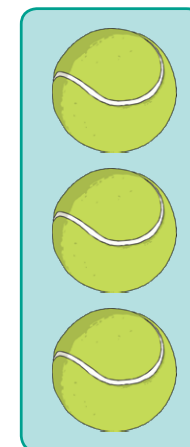
There are 69 tennis balls packed in tubes of 3.

There are 23 tubes altogether.

$$69 \div 3 = 23$$

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

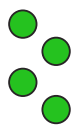
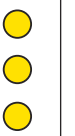
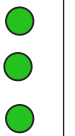
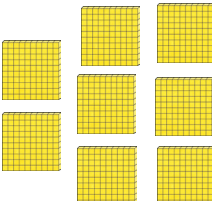
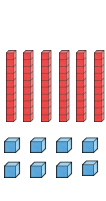
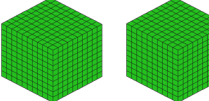
69		
23	23	23



Number and Place Value

Knowledge Organiser

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											
negative number											
partition											
digit											
Roman numeral											
 visit twinkl.com											

Compare and Order								1000 More or 1000 Less			
Th	H	T	O		Th	H	T	O	1000 Less		1000 More
				$4324 > 3243$ greater than							
				$879 < 2126$ less than							
2497	2508	3012	3521	3530	4002						
smallest					greatest						

1212	2212	3212
------	------	------

Number and Place Value

Knowledge Organiser

Negative Numbers



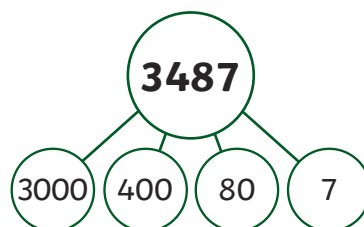
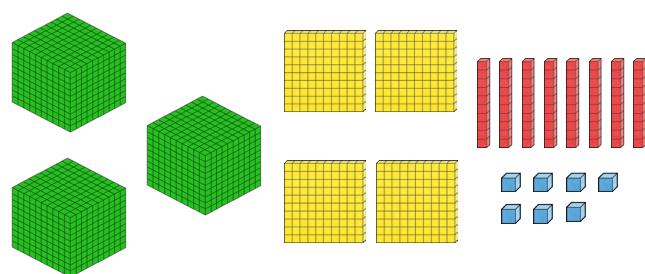
Represent 4-Digit Numbers

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

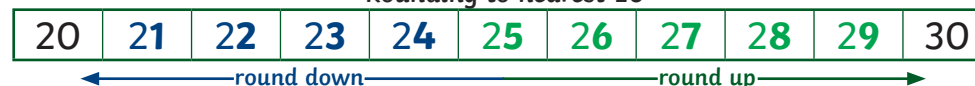
XXIX = 29

LXXXIV = 84

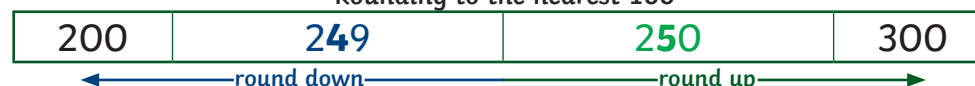
Rounding

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.

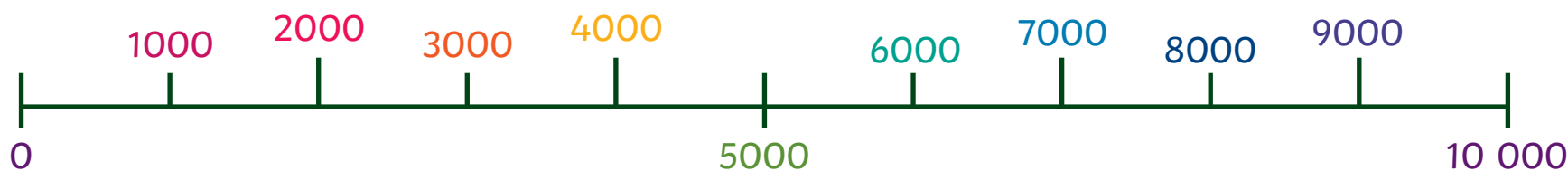
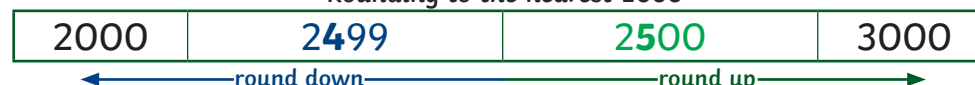
Rounding to nearest 10



Rounding to the nearest 100



Rounding to the nearest 1000



Key Vocabulary

coordinate

quadrant

x-axis

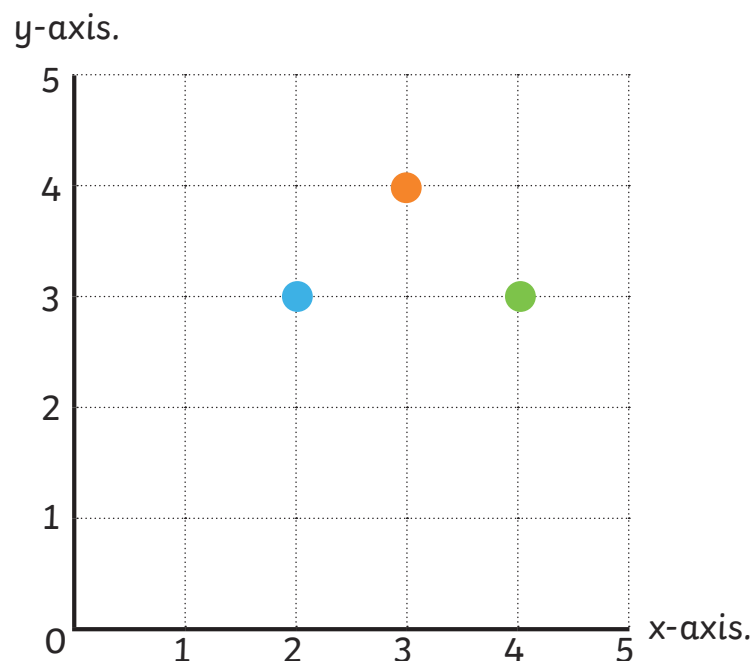
y-axis

translation

vertex

vertices

Position in the First Quadrant



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.

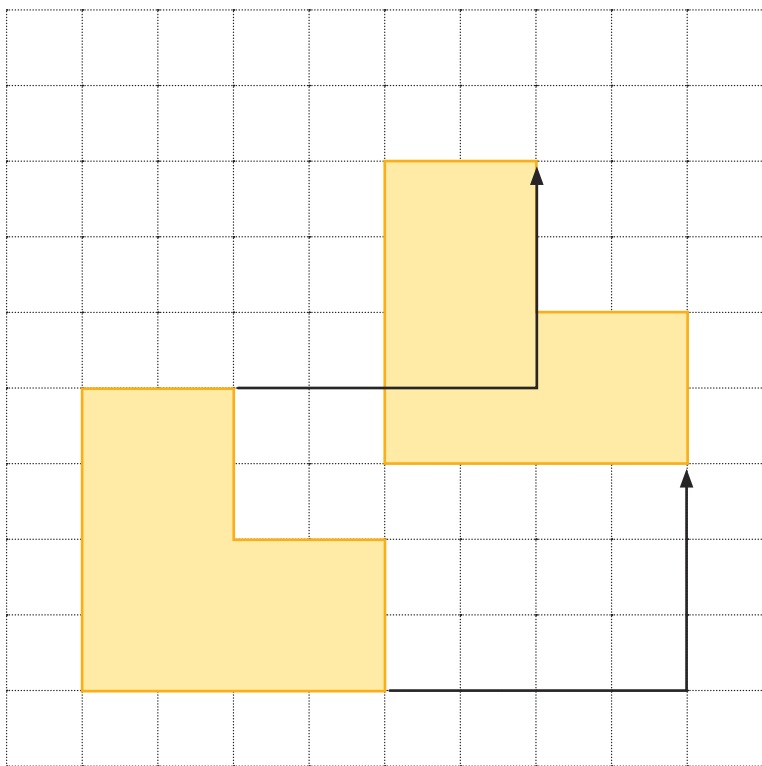


Position and Direction

Translation

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

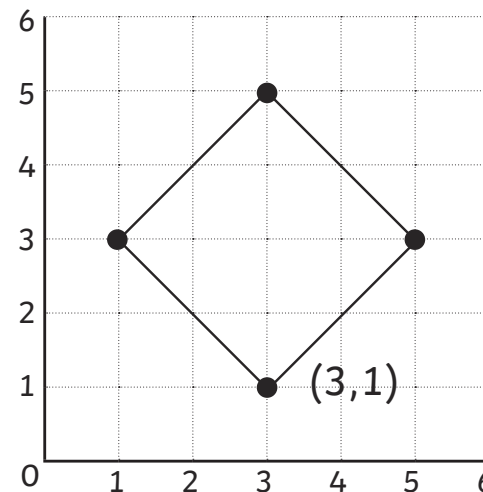
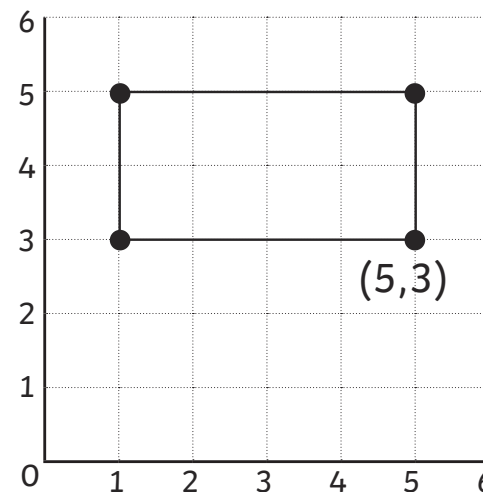
When translating an object on a grid, it can move up or down, left or right.



Knowledge Organiser

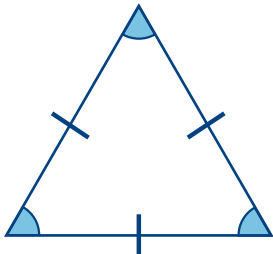
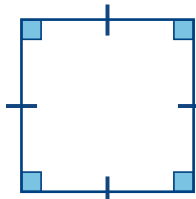
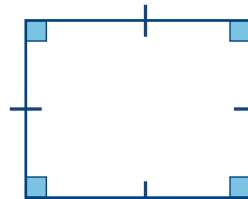
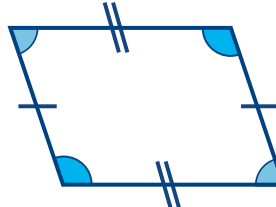
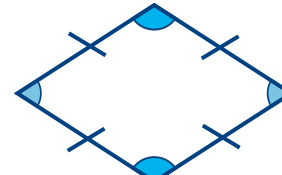
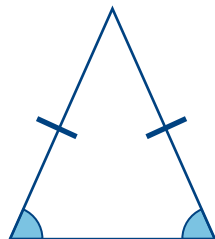
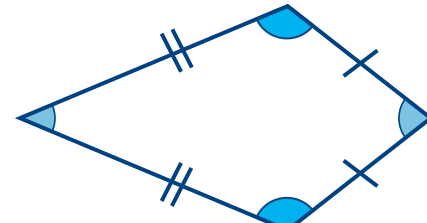
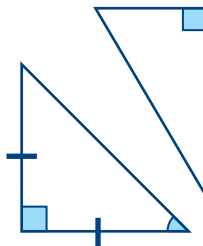
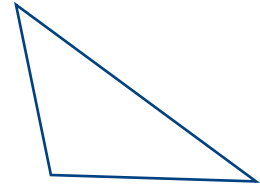
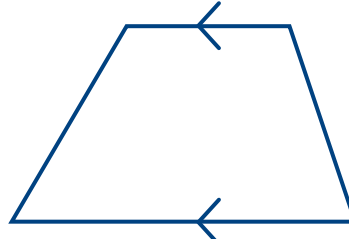
Plotting 2D Shapes

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



Properties of Shape

Knowledge Organiser

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



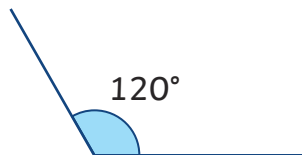
Acute angle

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



Obtuse angle

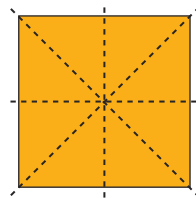
Any angle measuring more than 90 degrees but less than 180 degrees is obtuse.



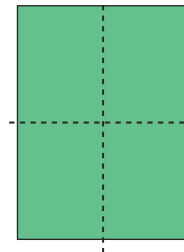
Lines of Symmetry

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.

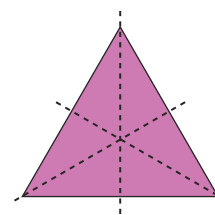
A square has four lines of symmetry.



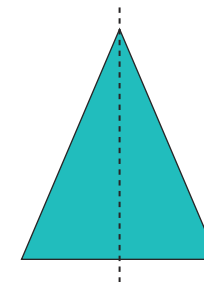
A rectangle has two lines of symmetry.



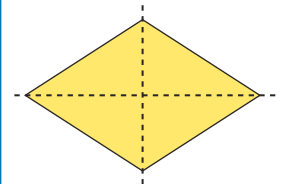
An equilateral triangle has three lines of symmetry.



An isosceles triangle has one line of symmetry.

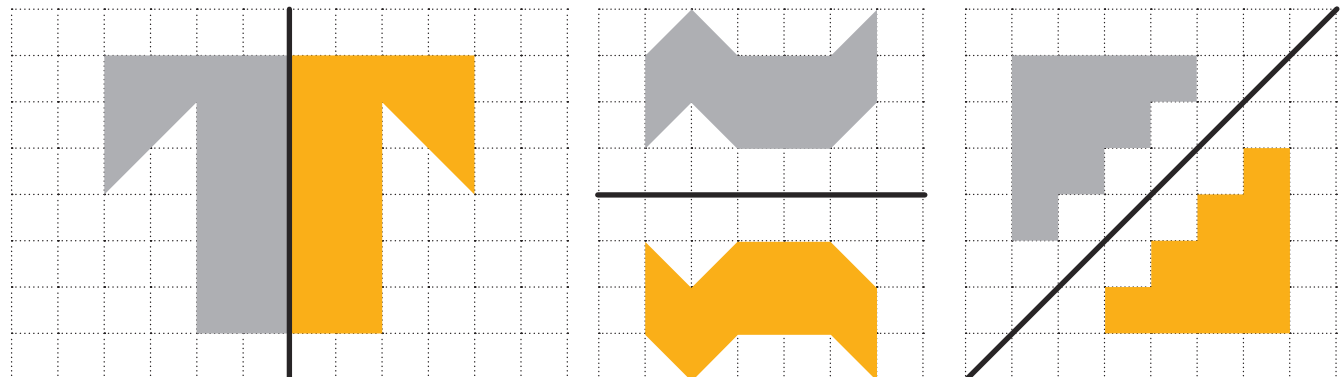


A rhombus has two lines of symmetry.



Symmetric Figures

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



Key Vocabulary

12-hour time

24-hour time

Roman numerals

analogue

digital

hours

minutes

seconds

o'clock

half past

quarter past

quarter to

midday

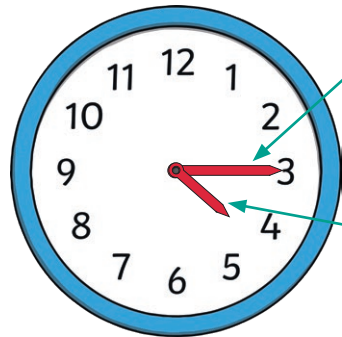
midnight

noon

a.m.

p.m.

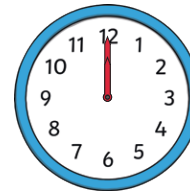
Analogue and Digital Clocks

**Minute Hand**

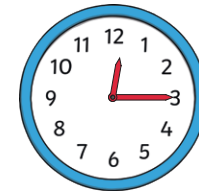
The long hand points to the minutes past the hour.

Hour Hand

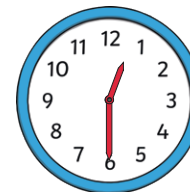
The short hand points to the hour. If this hand is pointing between the hours, it is the earlier hour of the two.



twelve
o'clock



quarter past
twelve

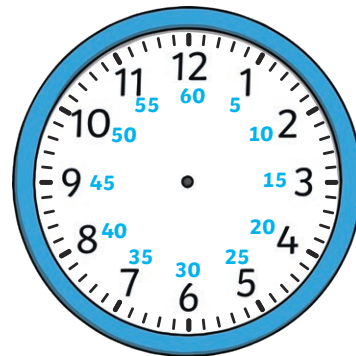


half past
twelve



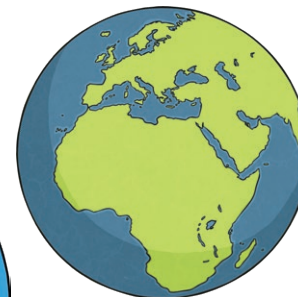
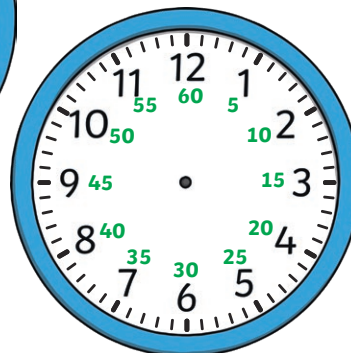
quarter to
one

Durations of Time



There are
60 seconds
in an minute.

There are
60 minutes
in an hour.



There are
24 hours
in a day

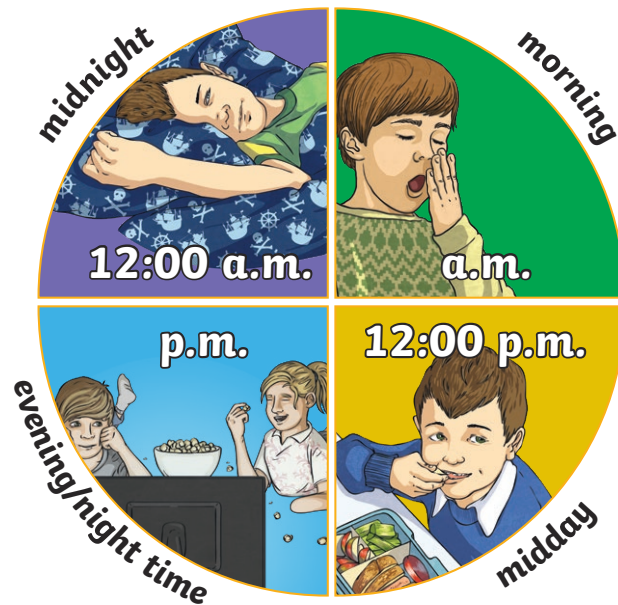
There are
7 days
in a week.



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	