Blue Class

Addition and Subtraction: Stage 3

Addition and Subtraction — Knowledge Organiser

Key Vocabulary

add
total
plus
sum
more
altogether
difference
subtract
less
minus
take away
column addition
column subtraction
exchange
estimate
inverse operation
solve problems
number facts
place value

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Addition and Subtraction Methods

3-digit and 1-digit numbers

Not crossing 10s

268 – 4 = 264

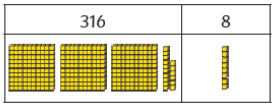
Hundred	Ten	Ones
●●	●●●	●●●●

343 + 6 = 349

Crossing 10s (Exchanging)

324		
300	20	4
300	10	14

316 + 8 = 324

316	8
	

324 - 8 = 316

3-digit and 2-digit numbers

Add and subtract tens

Hundred	Ten	Ones
●●	●●●	●

451 + 3 tens = 481 (5 + 3 = 8)

451 – 4 tens = 411 (5 – 4 = 1)

Crossing 10s (Exchanging)

258 + 80 = 338

- Column method
- Count in 10s mentally
- Add 100, subtract 20

Crossing 10 and 100

$$\begin{array}{r} 368 \\ +73 \\ \hline 1 \\ \hline 1 \end{array} \quad \begin{array}{r} 368 \\ +73 \\ \hline 41 \\ \hline 11 \end{array} \quad \begin{array}{r} 368 \\ +73 \\ \hline 441 \\ \hline 11 \end{array}$$

$$\begin{array}{r} {\scriptstyle 3\,1} \\ 441 \\ -73 \\ \hline 8 \end{array} \quad \begin{array}{r} {\scriptstyle 3\,13\,1} \\ 441 \\ -73 \\ \hline 68 \end{array} \quad \begin{array}{r} {\scriptstyle 3\,13\,1} \\ 441 \\ -73 \\ \hline 368 \end{array}$$

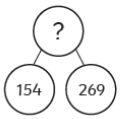
3-digit numbers

Not crossing

679 – 351 = 328

Hundred	Ten	Ones
●●●	●●●	●●●●●

Crossing 10s (Exchanging)



$$\begin{array}{r} 269 \\ +154 \\ \hline 423 \\ \hline 11 \end{array}$$

514	
268	?

$$\begin{array}{r} {\scriptstyle 4\,10\,1} \\ 514 \\ -\,268 \\ \hline 246 \end{array}$$

Add and Subtract 100s

284 + 300 = 584

Hundred	Ten	Ones
●●	●●●●●●●●●●	●
●●●		

Addition and Subtraction — Knowledge Organiser

Estimate

Estimate by dividing the hundred into 250 and 225.

Estimate 10s (330, 340) between 325 and 350.

Estimate 167 – 89

Use near numbers 170 – 90 = 80

Near numbers:

413	279	521	782
↓	↓	↓	↓
400	300	500	800

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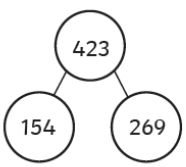
Check Answers

347	
273	74

347 – 74 = 273 can be checked using

273 + 74 = 347

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



154 + 269 = 423	269 + 154 = 423
423 – 154 = 269	423 – 269 = 154

Addition and Subtraction: Stage 4

Addition and Subtraction — Knowledge Organiser

Key Vocabulary

- Add
- 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

Addition and Subtraction Methods

Add 4-digit numbers

No exchange

$$\begin{array}{r} 5162 \\ +3427 \\ \hline 8589 \end{array}$$

Starting with the ones, add each column in turn.

One exchange

$$\begin{array}{r} 5162 \\ +3497 \\ \hline 8659 \\ \scriptstyle 1 \end{array}$$

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.

Multiple exchanges

$$\begin{array}{r} 5864 \\ +3497 \\ \hline 9361 \\ \scriptstyle 111 \end{array}$$

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

Subtract 4-digit numbers

No exchange

$$\begin{array}{r} 5789 \\ -3421 \\ \hline 2368 \end{array}$$

Starting with the ones, subtract each column in turn.

One exchange

$$\begin{array}{r} {\scriptstyle 6\ 1} \\ 5749 \\ -3471 \\ \hline 2278 \end{array}$$

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

Multiple exchanges

$$\begin{array}{r} {\scriptstyle 6131} \\ 5742 \\ -3476 \\ \hline 2266 \end{array}$$

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

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

5**39**2 + **4** tens = 5**43**2 crossing tens

5126 – **6**00 = **45**26 crossing hundreds

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

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

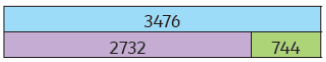
Round to the nearest thousand

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 =

As 420 + 280 = 700

(because 42 + 28 = 70)

420 + 280 + 372 = 700 + 372 = 1072

Multiplication and Division: Stage 3

Multiplication and Division — **Knowledge Organiser**

Key Vocabulary

- times tables
- multiply by
- divide by
- array
- fact families
- regrouping

Multiplication and Division Facts (3, 4 and 8 multiplication tables)

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

3 x Tables

1 × 3 = 3	3 ÷ 3 = 1
2 × 3 = 6	6 ÷ 3 = 2
3 × 3 = 9	9 ÷ 3 = 3
4 × 3 = 12	12 ÷ 3 = 4
5 × 3 = 15	15 ÷ 3 = 5
6 × 3 = 18	18 ÷ 3 = 6
7 × 3 = 21	21 ÷ 3 = 7
8 × 3 = 24	24 ÷ 3 = 8
9 × 3 = 27	27 ÷ 3 = 9
10 × 3 = 30	30 ÷ 3 = 10
11 × 3 = 33	33 ÷ 3 = 11
12 × 3 = 36	36 ÷ 3 = 12

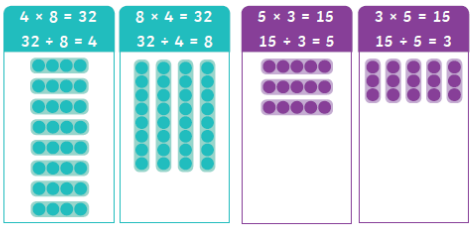
4 x Tables

1 × 4 = 4	4 ÷ 4 = 1
2 × 4 = 8	8 ÷ 4 = 2
3 × 4 = 12	12 ÷ 4 = 3
4 × 4 = 16	16 ÷ 4 = 4
5 × 4 = 20	20 ÷ 4 = 5
6 × 4 = 24	24 ÷ 4 = 6
7 × 4 = 28	28 ÷ 4 = 7
8 × 4 = 32	32 ÷ 4 = 8
9 × 4 = 36	36 ÷ 4 = 9
10 × 4 = 40	40 ÷ 4 = 10
11 × 4 = 44	44 ÷ 4 = 11
12 × 4 = 48	48 ÷ 4 = 12

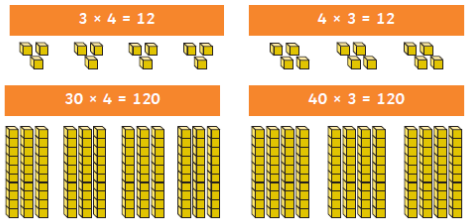
8 x Tables

1 × 8 = 8	8 ÷ 8 = 1
2 × 8 = 16	16 ÷ 8 = 2
3 × 8 = 24	24 ÷ 8 = 3
4 × 8 = 32	32 ÷ 8 = 4
5 × 8 = 40	40 ÷ 8 = 5
6 × 8 = 48	48 ÷ 8 = 6
7 × 8 = 56	56 ÷ 8 = 7
8 × 8 = 64	64 ÷ 8 = 8
9 × 8 = 72	72 ÷ 8 = 9
10 × 8 = 80	80 ÷ 8 = 10
11 × 8 = 88	88 ÷ 8 = 11
12 × 8 = 96	96 ÷ 8 = 12

Write and Calculate Mathematical Statements



Related Calculations



Multiplication and Division — **Knowledge Organiser**

Written Multiplication Methods - No Regrouping

Tens	Ones

23 × 3 = 69

	T	O
	2	3
×		3
	6	9

Written Multiplication Methods - With Regrouping

Tens	Ones

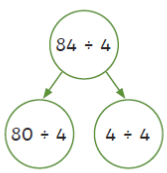
24 × 4 = 96

	T	O
	2	4
×		4
	9	6
	1	

Written Division Methods - No Regrouping

Tens	Ones

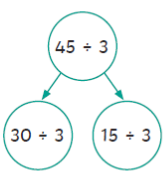
	2	1
4	8	4



Written Division Methods - With Regrouping

Tens	Ones

	1	5
3	4	¹5



Multiplication and Division: Stage 4

Multiplication and Division — Knowledge Organiser

Key Vocabulary

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

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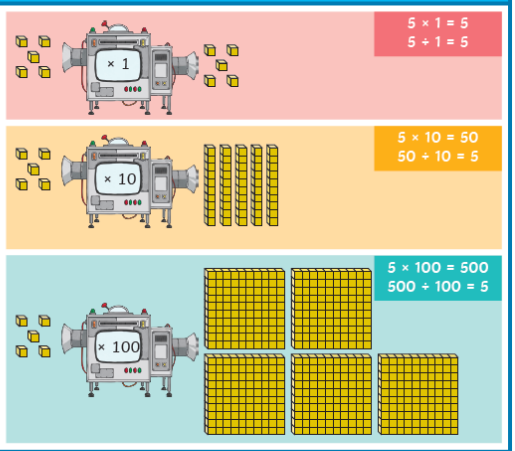
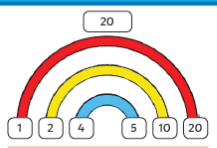
Multiplication and Division Facts

×	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

Use Place Value to Multiply and Divide Mentally



Factor pairs and Commutativity



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 × 4 = 20

4 × 5 = 20

Multiply Using Formal Written Methods

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

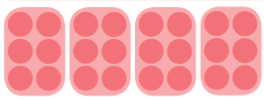
Th	H	T	O
	5	4	3
×			4
2	1	7	2
	1	1	

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

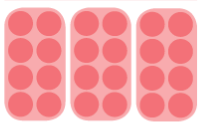
Multiplication and Division — Knowledge Organiser

Mental Calculations for Solving Problems

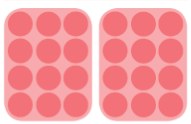
(2 × 3) × 4 = 24

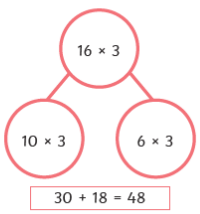


(2 × 4) × 3 = 24



(3 × 4) × 2 = 24



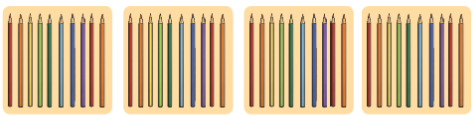


30 + 18 = 48

Integer Scaling Problems

10 pencils

10 x 4 = 40 pencils



75g

75g × 2 = 150g

Short Division with Exact Answers

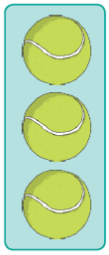
There are 69 tennis balls packed in tubes of 3.

There are 23 tubes altogether.

69 ÷ 3 = 23

$$3 \overline{)\,69}\quad 23$$

69		
23	23	23



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Number and Place Value: Stage 3

Number and Place Value — Knowledge Organiser

Key Vocabulary

- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- more
- less
- partition
- digit

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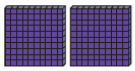
3-Digit Numbers

256

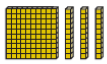
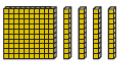
two hundred	fifty	six
		
200	50	6

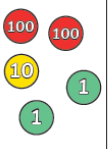
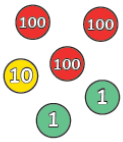
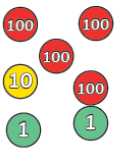
Counting in 4s and 8s

0	4	8	12	16	20	24	28	32	36	40

0	8	16	24	32	40	48	56	64	72	80

10 and 100 More or Less

Ten Less		Ten More
		
120	130	140

One Hundred Less		One Hundred More
		
212	312	412

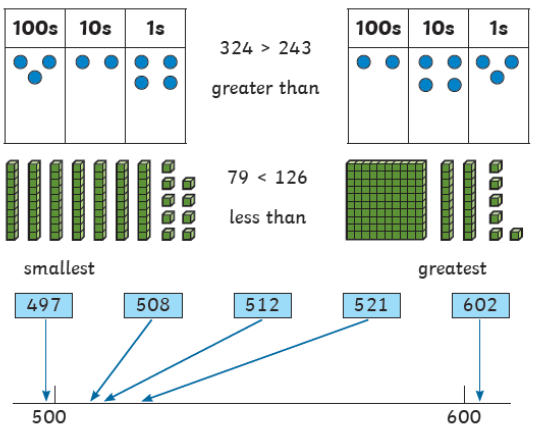
Counting in 50s and 100s

0	50	100	150	200	250	300	350	400	450	500

0	100	200	300	400	500	600	700	800	900	1000

Number and Place Value — Knowledge Organiser

Compare and Order

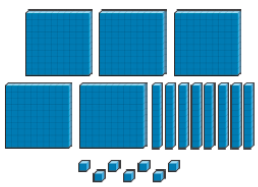


Represent Numbers to 1000

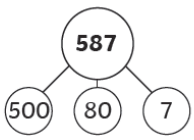
587

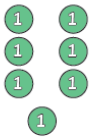
five hundred and eighty-seven

Hundreds	Tens	Ones
		



500 + 80 + 7



Hundreds	Tens	Ones
		

Numerals and Words to 1000

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Number and Place Value: Stage 4

Number and Place Value — Knowledge Organiser

Key Vocabulary

- thousands
- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- round
- rounded to
- negative number
- partition
- digit
- Roman numeral

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Counting

Counting in 6s

0	6	12	18	24	30	36	42	48	54	60

Counting in 7s

0	7	14	21	28	35	42	49	56	63	70

Counting in 9s

0	9	18	27	36	45	54	63	72	81	90

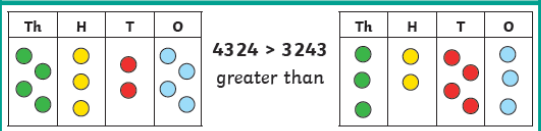
Counting in 25s

0	25	50	75	100	125	150	175	200	225	250

Counting in 1000s

0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10 000

Compare and Order



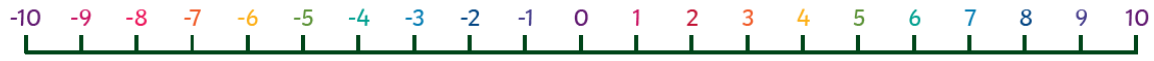
2497 2508 3012 3521 3530 4002

smallest greatest

1000 More or 1000 Less

Number and Place Value — Knowledge Organiser

Negative Numbers

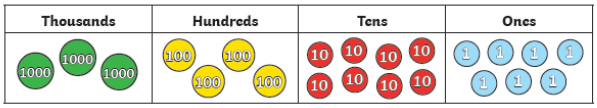


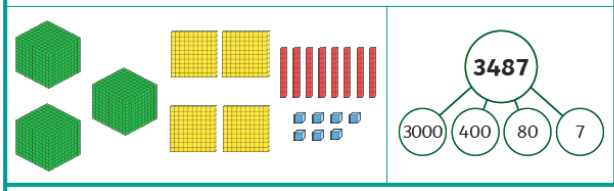
Represent 4-Digit Numbers

3487

three thousand, four hundred and eighty-seven

1000s	100s	10s	1s
III	IIII	IIII III	IIII II





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

20	21	22	23	24	25	26	27	28	29	30

round down — round up

Rounding to the nearest 100

200	249	250	300

round down — round up

Rounding to the nearest 1000

2000	2499	2500	3000

round down — round up

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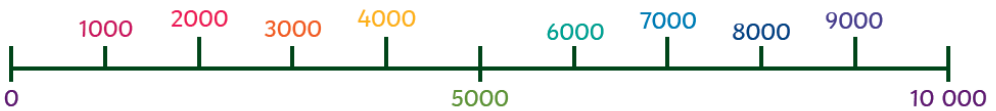


Properties of Shape: Stage 3

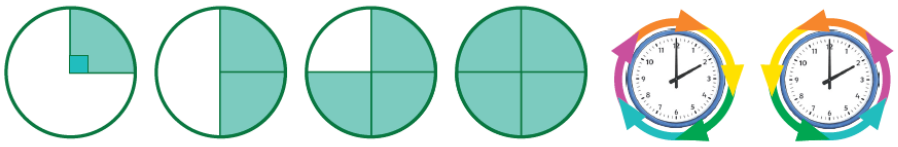
Properties of Shapes — Knowledge Organiser

Key Vocabulary

- quarter turn
- half turn
- three-quarter turn
- angle
- right angle
- acute
- obtuse
- horizontal
- vertical
- parallel
- perpendicular
- polygon
- two-dimensional
- three-dimensional
- flat face
- curved surface
- edge
- curved edge
- vertex
- vertices
- apex

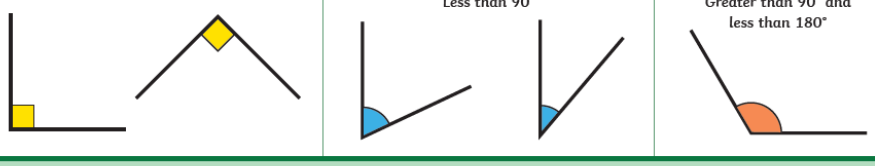
Turns and Angles

Angles can be used as a description of a turn.

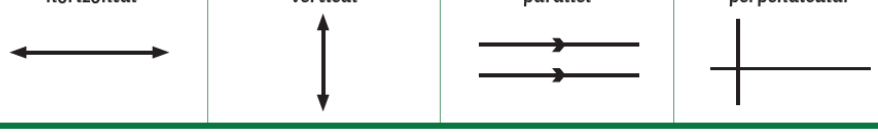


$\frac{1}{4}$ turn | $\frac{1}{2}$ turn | $\frac{3}{4}$ turn | 1 turn | clockwise | anticlockwise

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

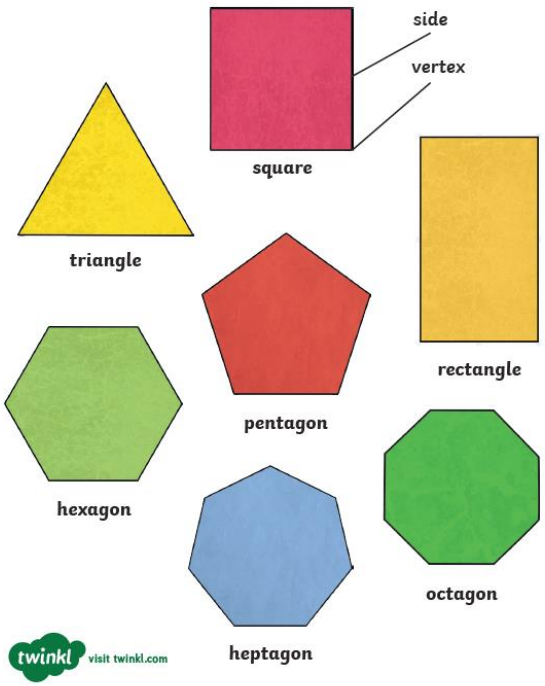


Type of Lines

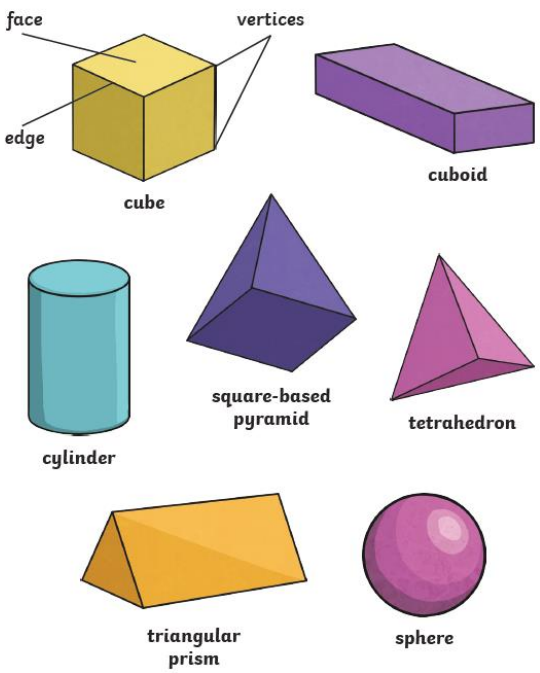


Properties of Shapes — Knowledge Organiser

Recognise and Describe 2D Shapes



Recognise and Describe 3D Shapes



Properties of Shape: Stage 4

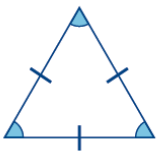
Properties of Shape — Knowledge Organiser

Key Vocabulary

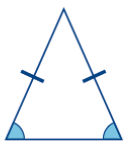
- angle
- right angle
- acute
- obtuse
- horizontal
- vertical
- diagonal
- parallel
- perpendicular
- two-dimensional
- polygon
- line of symmetry
- reflection
- mirror line
- isosceles
- equilateral
- scalene
- quadrilateral
- rhombus
- parallelogram
- trapezium

Triangles

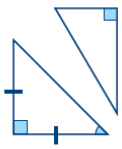
Triangles have 3 sides and 3 vertices. The total of the angles in a triangle is 180°.



An equilateral triangle is a regular polygon. It has sides of equal length and each angle is 60°.

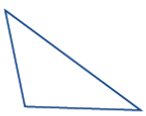


An isosceles triangle has two sides of equal length and two angles of equal size.



A right-angled triangle always has one 90° angle.

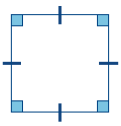
It can be isosceles or scalene.



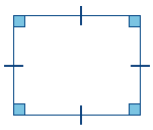
A scalene triangle has no equal sides or angles.

Quadrilaterals

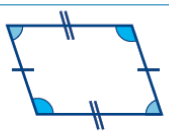
A quadrilateral is a polygon with four sides.



A square has four sides of equal length and four right angles (90°). A square is also a rectangle, a rhombus and a parallelogram.

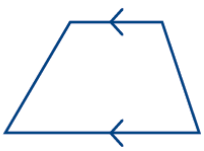


A rectangle has two pairs of parallel, equal sides and four right angles. A rectangle is also a parallelogram.

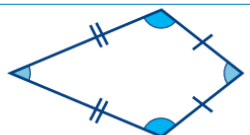


A parallelogram has two pairs of parallel, equal sides and opposite equal angles.

A rhombus has four sides of equal length and opposite equal angles. A rhombus is also a parallelogram.



A trapezium only has one pair of opposite parallel sides.



A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.

Properties of Shape — Knowledge Organiser

Angles

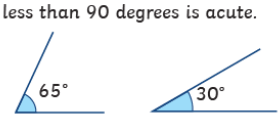
An angle is created when two straight lines meet at a point or intersect.

Right angle

The intersection of perpendicular lines creates a right angle.

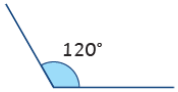
Acute angle

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



Obtuse angle

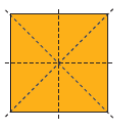
Any angle measuring more than 90 degrees but less than 180 degrees is obtuse.



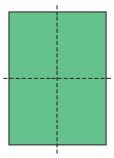
Lines of Symmetry

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.

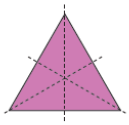
A square has four lines of symmetry.



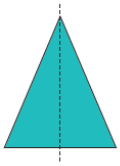
A rectangle has two lines of symmetry.



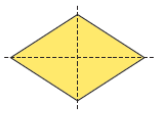
An equilateral triangle has three lines of symmetry.



An isosceles triangle has one line of symmetry.

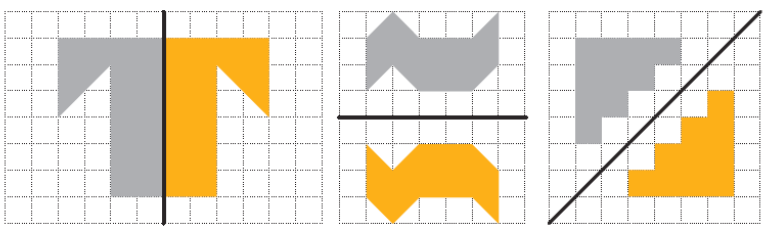


A rhombus has two lines of symmetry.



Symmetric Figures

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



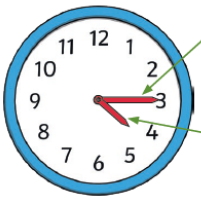
Time: Stage 3

Time — Knowledge Organiser

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

Analogue and Digital Clocks



Minute Hand
The long hand points to the minutes past or the minutes to the hour.

Hour Hand
The short hand points to the hour. If this hand is pointing between hours, it is either past the earlier hour or to the later hour.

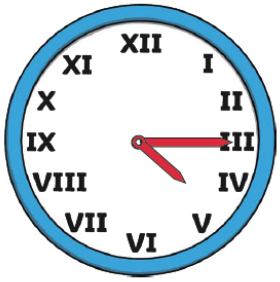
twelve o'clock

quarter past twelve

half past twelve

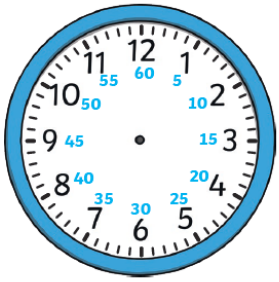
quarter to one

Time and Roman Numerals



Hours, Minutes and Seconds

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

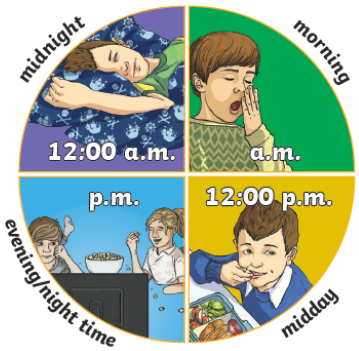


There are **60 minutes** in an hour.

Time — Knowledge Organiser

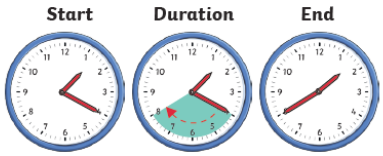
24-Hour Time

There are 24 hours in a day.



	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	

Calculate Durations of Time



20 minutes has passed.

Compare Durations of Time

Compare the time using the vocabulary 'longer' and 'shorter'.

180 seconds	**is the same as**	3 minutes.
90 minutes	**is shorter than**	2 hours.
48 hours	**is longer than**	1 day.

Time: Stage 4

Time — Knowledge Organiser

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.

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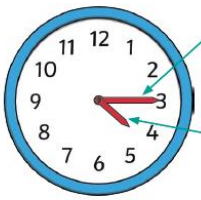
Analogue and Digital Clocks



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.

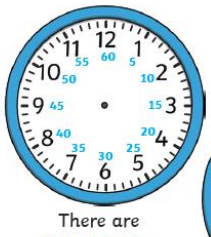
twelve o'clock

quarter past twelve

half past twelve

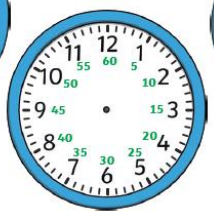
quarter to one

Durations of Time



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

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



There are **24 hours** in a day

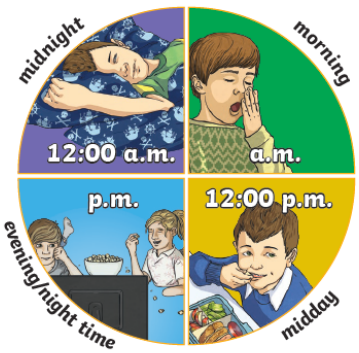
There are **7 days** in a week.

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

Time — Knowledge Organiser

24-Hour Time

There are 24 hours in a day.



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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	
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16:00	4 p.m.	4 o'clock	
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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	