

Maths quiz: memory mastermind!

Multiplication and division vocabulary

- 1) List all the **factors** of 36: _____
- 2) List all the **common factors** of 24 and 32: _____
- 3) List all the **prime numbers** under 20: _____
- 4) What's a **composite number**? _____
- 5) What are the **prime factors** of 12? _____
- 6) List the first 6 **multiples** of 9: _____, _____, _____, _____, _____ and _____
- 7) What is the **lowest common multiple** of 4 and 6? _____
- 8) List 3 different **square numbers**: _____, _____ and _____
- 9) What is 3^3 ? _____

Fractions, decimals & percentages

Complete the conversion grid.

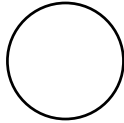
Fraction	Decimal	Percentage	Operation
$\frac{1}{2}$			
	0.2		
		1%	
			$\div 10$
$\frac{3}{4}$			$\div 4, \times 3$
	0.25		
		5%	

Angles

Complete the grid.

How many degrees...	
in a full turn?	°
in a half turn?	°
in a right angle?	°
in an acute angle?	°
in an obtuse angle?	°
in a reflex angle?	°
on a straight line?	°
inside a triangle?	°
inside a quadrilateral?	°

Shape vocabulary

Draw a horizontal line.	Draw a vertical line.	Draw a pair of parallel lines.	Draw a pair of perpendicular lines.	Label this circle with its circumference, radius and diameter .
				

Roman numerals

Complete the grid.

1 = I	= X	100 =	1000 =
= V	50 =	= D	

2D shapes

Complete the grid.

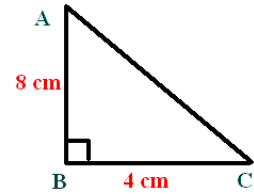
Name	No. of sides
octagon	
	5
nonagon	
	7
quadrilateral	
	10
hexagon	

What is a **polygon**? _____

What's the difference between a **regular** and **irregular** polygon?

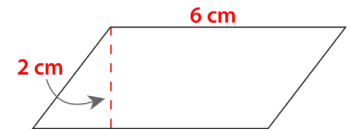
What is the area of this triangle?

Area = _____



What is the area of this parallelogram?

Area = _____



Below each shape, write its name (don't just write 'triangle' for the first 3 – be specific!)

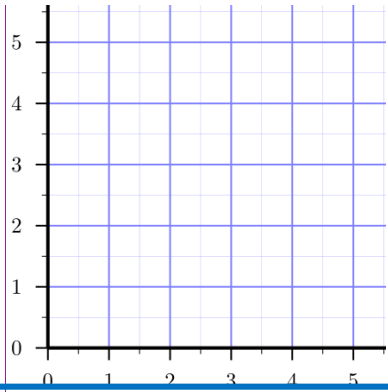
Measurement conversions

- List all the months that have exactly 31 days: _____
- List all the months that have exactly 30 days: _____
- What's different about a leap year? _____

Complete the conversions.

1cm =	mm	1km =	m	1 litre =	ml
1m =	cm	1 mile =	km	1 kilogram =	g

Co-ordinates Write an **X** on the co-ordinate (3,5).



The mean

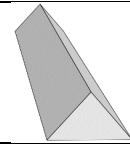
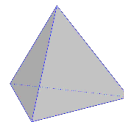
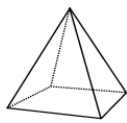
What is the mean of the following numbers?

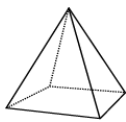
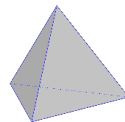
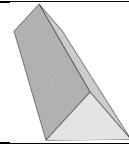
5, 7, 2, 8, 3

Mean = _____

3D shapes

Complete the grid.



Complete the grid.			
What is this shape called?			
How many faces does it have?			
How many edges does it have?			
How many vertices does it have?			



NEW Year 7 PROBLEM SOLVING IN MATHEMATICS

A booklet full of problem solving and puzzles to keep you busy over summer.

Bring any completed tasks to your first maths lesson, there will be rewards waiting for you.

Sequences

Find the next three terms in each of the following linear sequences.

- 60, 74, 88, ____, ____, ____
- 8000, 11 000, 14 000, ____, ____, ____
- 90, 85, 80, ____, ____, ____
- 0.9, 1.2, 1.5, ____, ____, ____
- 7.42, 6.81, ____, ____, ____

Here is a linear sequence.

7, 11, 15, 19, 23...

Jack says,



As the fifth term of this sequence is 23, the tenth term will be 2 times 23, which is 46

Explain why Jack is wrong.

A sequence starts with the number 17. The next number is found by doubling the previous number and adding 3. Find the first five terms of the sequence. What do you notice?



Create a **geometric** sequence whose last digits are always 6

Describe in words how these sequences change from one term to the next:

- 1, 2, 3, 6, ____, ____
- 64 000, 32 000, 16 000, ____, ____
- 8, 24, 72, ____, ____
- 100, 150, 225, ____, ____, ____
- 1, 1, 2, 3, 5, 8, ____, ____

Algebraic Notation

Write these expressions without mathematical operation signs.

$$f + f + f + f + f + f \quad 7 \times g = 7g$$

$$t \div 5 \quad 5 \div t$$

$$m \times m \quad d \times c$$

Substitute $n = 1, n = 2, n = 3, n = 4$ and $n = 5$ into all of these expressions.

$$n + 7 \quad 3n \quad n^2$$

$$20 - n \quad \frac{n}{2} \quad \frac{2}{n}$$

What do you notice about each set of answers?

For each of these function machines, find the function that gives the outputs shown for the given inputs.

$$a \rightarrow \boxed{?} \rightarrow 5a$$

$$b \rightarrow \boxed{?} \rightarrow b - 3$$

$$10c \rightarrow \boxed{?} \rightarrow 2c$$

$$y \rightarrow \boxed{?} \rightarrow xy$$

$$x \rightarrow \boxed{?} \rightarrow x^2$$

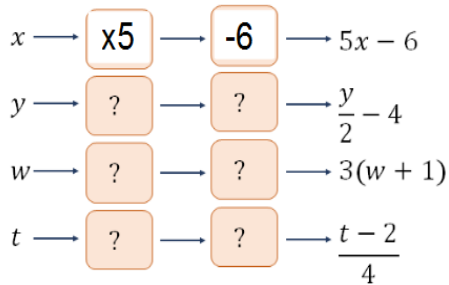
$$d \rightarrow \boxed{?} \rightarrow d - g$$

Do any of the machines have more than one possible answer?

Substitute $a = 5$ into each of these expressions.

$7a$	$\frac{7}{a}$	$19.8 - a$	a^2
$2a$	$a - 3.6$	$a + 3.6$	

Fill in the gaps in these function machines.



Which of these expressions will be equal when $x = 2$?

$2x$	$\frac{x}{2}$	$\frac{2}{x}$	$x + 2$
$2 + x$	$x - 2$	$2 - x$	x^2

Put the expressions in order from smallest to largest for different values of x

(Try $x = 1$, $x = 0.4$, $x = 100$, $x = 0 \dots$)

Which expressions will always be equal, whatever the value of x ?

1 How many £10 notes are there in £760 000?

2 Answer true or false:

(a) $7 + 8 + 9 + 10 + 11 = 5 \times 9$

(b) $1 + 2 + 3 + \dots + 14 + 15 = 15 \times 8$

(c) $\frac{(100 - 75) \times 4}{10} = (20\,000 - 19\,000) \div 100$

3 A determined frog is climbing a greasy rope. It takes $8\frac{1}{2}$ seconds to climb up and then half a second to slide down.

How many complete up and down journeys can he make in three minutes?



Find a number p so that $6 \times p + 8 = 68$.

Find a pair of numbers a and b for which $8 \times a + b = 807$.

Find a pair of numbers p and q for which $7 \times p + 5 \times q = 7050$.

1	2			3	4
5			6		
		7			
	8				9
10				11	
12					

Clues across

1. $413 - 61$
3. 17×4
5. $3 \times 3 \times 3 \times 3$
6. 9×16
7. Half of 980
8. $1003 - 985$
10. $472 + 256$
11. $712 - 618$
12. $4006 - 2994$

Clues down

1. $5 \times 11 \times 7$
2. 17×3
3. $7 + 17 + 117 + 499$
4. $173 - 89$
6. $9 \times 12 - 89$
7. $5002 - 121$
8. $28 + 29 + 31 + 32$
9. 9×49
10. $(16 \times 5) - 9$

Complete these multiplication grids

(a)

	8	2	7
5			35
	32		
3	27		
6			

(b)

	4	7	3	8
5				
	42			
2				

(c)

	5	8	2
	28	56	
6			
9			

(d)

	4	3
	45	72
	30	
7	35	

(e)

	7	9	
24		32	
			18
	42		

(f)

	5	7	
	40	32	
3			
6	12		

(g)

	35	40	15
			18
18			27

(h)

	8	
		27
	56	
	40	30
		36

- 1 Train tickets cost £5. How many tickets can be bought for £88?
- 2 A car can carry 3 children as passengers. How many cars are needed to carry 40 children?
- 3 There are 23 children in a class. How many teams of 4 can be made?



- 4 Eggs are packed six in a box. How many boxes do I need for 200 eggs?
- 5 Tickets cost £6 each and I have £80. How many tickets can I buy?
- 6 I have 204 plants and one tray takes 8 plants. How many trays do I need?

- 7 There are 51 children in the dining room and a table seats 6. How many tables are needed to seat all the children?

- 8 A prize consists of 10 000 one pound coins. The prize is shared between 7 people. How many pound coins will each person receive?



- 9 How many 9p stamps can I buy with a £5 note?

Find the missing numbers in these calculations

$$\begin{array}{r} \square 84 \\ \times \quad \square \\ \hline 7056 \end{array}$$

$$\begin{array}{r} \square \square 8 \\ \times \quad \square \\ \hline 2646 \end{array}$$

$$\begin{array}{r} \square \square 6 \\ \times \quad \square \\ \hline 3648 \end{array}$$

$$\begin{array}{r} 537 \\ \square \overline{)3\square\square\square} \end{array}$$

$$\begin{array}{r} 564 \\ \square \overline{)4\square\square\square} \end{array}$$

1



The length of this rectangle is twice the width.
The perimeter is 42 cm. Calculate the area of the rectangle.

2 What number, when divided by 14 and then multiplied by 37, gives an answer of 962?

3 Mike knows that $221 \times 31 = 6851$. Explain how he can use this information to work out 222×31 .

4 Given that $357 \times 101 = 36\,057$, work out 358×101 without multiplying.

5 Use each of the digits 1 to 6.
Put one digit in each box to make the statement true.

$$\square 5 \square \times \square = 1 \square \square$$

Each empty square contains either a number or an operation (+, −, ×, ÷).

Fill in the missing details. The arrows are equals signs.

57	÷	3	→	
+		×		
		53	→	200
↓		↓		
204	−		→	

18	×		→	90
×		+		
0.1			→	1
↓		↓		
	+		→	16.8

25	×		→	10
×		+		
	×		→	
↓		↓		
150	−		→	149

Place Value

State the value of the 5 in each of these numbers.

650	6500	560 000	60 500
65 000	56	6 005 000	56 000 000
65 000 000	665 066 600		

Put these numbers in ascending order.

346.01	306.41	316.04	361.04
364.01	310.46	340.16	

The table shows the heights of the highest mountains in some of the countries in Europe.

Country	Height (m)
France	4808
Belgium	694
England	978
Sweden	2104
Russia	5642
Croatia	1831

Work out the range of these heights.

$86 < 101$ and $101 > 86$ are both **true**.

Decide which statements below are true and which are false.

$902 < 93$	$8106 > 8099$	$3751 < 3699$
$203\ 000 < 199\ 987$	$32\ 150 = 31\ 205$	$809 > 820$
$601 \times 1000 > 10\ 000 \times 59$	$903\ 000 \div 100 > 88\ 000$	

Rewrite the false statements, using the same numbers, making them true.

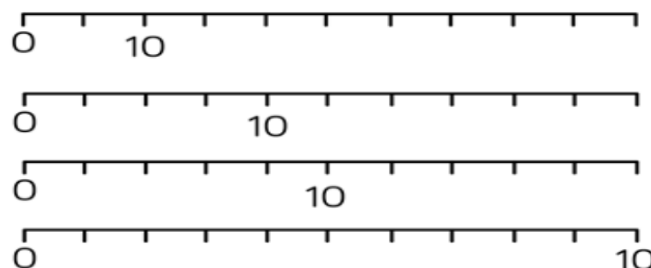
Can you do this in more than one way?

Which of these numbers would be sensible to round to the nearest 10?

9761	145	48 312	603 156
287	48	19 201	671
5.9	797	23.5	1542

What would be the most sensible choice for rounding the other numbers?

Fully label these number lines.



Write in figures:

- Thirty-five thousand million
- One and a half billion
- Two hundred and three thousand, five hundred and twelve
- Eighty-eight million, eighty-eight thousand
- Half a million
- One billion, ten thousand and one

Write these numbers in decimal form and then put them in order, starting with the smallest.

Zero point three five

Fifty hundredths

Seventy-two hundredths

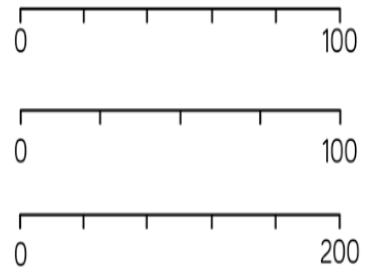
One tenth

Nought point nought seven

Nought point nought three

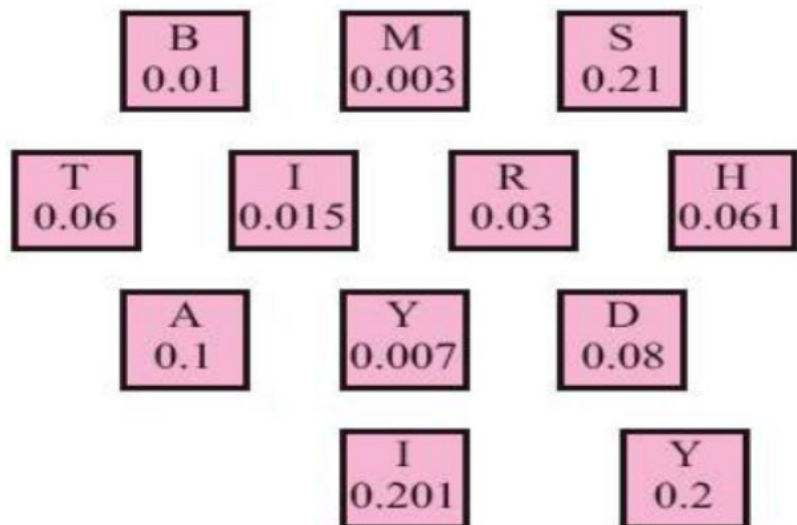
Two hundredths

Where would 80 be on each of these number lines?



Here are numbers with letters.

- (a) Put the numbers in order, smallest first.
Write down just the letters.
- (b) Finish the sentence using letters and numbers of your own. The numbers must increase from left to right.



Complete the cross number puzzle. There are decimal points on some lines.

1	2		3	4	5
6		7		8	
	9		10		
11			12	13	
14	15			16	17
18			19		

Clues across

1. 4×1.9
3. $6.2 \div 5$
6. $83.2 \div 4$
8. $0.42 \times 2 \times 50$
9. $348 \div 3$
12. 0.95×40
14. $928 + 45$
16. $31.8 \div 6$
18. $2004 - 1989$
19. $5.1 \div 5$

Clues down

1. $36.4 + 35.6$
2. $542 + 5 + 54$
4. $7.2 \div 3$
5. $(85 \times 5) \div 10$
7. 0.081×1000
10. $31.5 \div 5$
11. $200 - (0.9 \times 10)$
13. 0.85×1000
15. $60 \div 8$
17. $0.0032 \times 100 \times 100$

Sad news of the sparrow that was killed a year ago in Leeuwarden in the Netherlands, in dramatic circumstances. The sparrow flew onto a set on which an attempt at creating a world record of toppled dominoes was being made. The bird knocked over 23 000 dominoes before it was cornered and shot to prevent it causing further mayhem.

It takes an experienced domino technician 5.2 seconds to place each piece in position for the record attempt.

How long will it take to repair the damage caused by the unfortunate sparrow? Give your answer in hours, correct to one decimal place.

Fractions, decimals and percentages

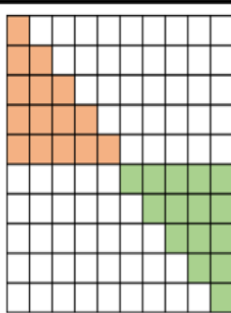
Complete the table.

Fraction	Tenths	Hundredths	Thousandths
$\frac{1}{2}$			$\frac{500}{1000}$
$\frac{1}{4}$		$\frac{25}{100}$	
$\frac{1}{8}$			
$\frac{5}{8}$			

Which of these are the same as $7 \div 10$?

$$\frac{100}{70} \quad \frac{7}{10} \quad \frac{70}{100} \quad 0.7 \quad \frac{10}{7} \quad 0.70$$

Write a division for each of those that are not the same as $7 \div 10$



Sam thinks 25% of the grid is shaded in total. Is he right?

What percentage of the shape is not shaded?

Sam wants to represent 330% using hundred squares. How many hundred squares does he need?

Put these numbers in order of size, starting with the smallest:

$$\frac{5}{8} \quad \frac{607}{1000} \quad \frac{4}{5} \quad \frac{3}{4} \quad \frac{63}{100}$$

Work out

$\frac{3}{10} + 0.6$

$\frac{21}{100} - 0.1$

$1 - \frac{9}{10}$

Circle the expressions that are equivalent to three-quarters of the number x ?

$$\frac{3x}{4}$$

$$\frac{3}{4}x$$

$$0.75x$$

$$\frac{x}{4} \times 3$$

$$0.34x$$

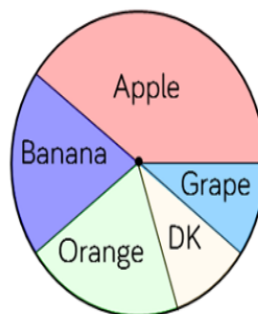
This pie chart shows the results of a survey of people's favourite fruits.

10% said "don't know" (DK).

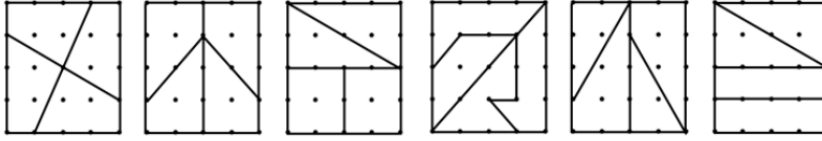
What fraction chose a fruit?

Estimate the total percentage that chose either apple or grape.

What other questions could you ask?



Which of these shapes are split into quarters and which are not?



How many more ways can you find to split a 4 by 4 dotted square into quarters?

Christina says:







0.35 is the same as 35%, so
0.3 is the same as 3%

Explain why Christina is wrong.

Find three ways to show that $\frac{4}{5}$ is greater than $\frac{3}{4}$

In each of these lists, two of the numbers are not equal to the others.

Which two?

 $\frac{3}{10}$	0.03	0.3	$\frac{1}{3}$	30%
 $\frac{8}{100}$	80%	$\frac{4}{50}$	0.08	$\frac{100}{8}$
 35%	$\frac{7}{20}$	0.14	0.305	$\frac{14}{40}$
 0.125	13%	$\frac{4}{32}$	0.125	12.5%

Using each number once, find the calculation which gives the correct answer.

For example:

Numbers	Answer	Calculation
5, 3, 6	3	$(6 - 5) \times 3 = 3$





	Numbers	Answer	Calculation		Numbers	Answer	Calculation
1.	2 4 8	6		2.	2 3 5	21	
3.	7 2 3	3		4.	9 2 4	7	
5.	8 4 5	20		6.	20 2 3	6	
7.	7 2 4	30		8.	7 22 6	20	
9.	6 4 3	8		10.	8 40 3	8	
11.	8 36 4	5		12.	7 49 2	14	
13.	21 14 11	24		14.	16 3 9	57	
15.	12 4 16	7		16.	24 42 6	24	
17.	18 5 13	25		18.	40 6 16	4	
19.	7 8 6	50		20.	13 8 4	44	
21.	4 3 9	12		22.	7 9 3	21	
23.	45 4 3	11		24.	121 11 7	77	

Test 1

- Write down a factor of 35 greater than one.
- How many more than 17 is 80?
- Find the change from a £10 note if you spend £2.30.
- The perimeter of a square is 20 cm. What is the area of the square?
- What is two point nought one multiplied by one thousand?
- How many fifteens are there in three hundred?
- What is the difference between 1.7 and 8?
- What is the remainder when 50 is divided by 7?
- Write the number 'one and a half billion' in figures.
- What number is exactly mid-way between 4 and 4.1?
- Work out two squared plus two cubed.
- A length of 210 mm is cut from a rod of length one metre. What is the length of the remaining rod?
- How many edges does a square based pyramid have?
- How many lines of symmetry does a regular hexagon have?
- An ant walks 20 cm in 5 seconds. How far will it walk in one minute?
- Find the new price of a £50 scanner after a 10 per cent increase.

The totals for the rows and columns are given. Unfortunately some of the totals are hidden by ink blots. Find the values of the letters.

(a)


A	A	A	A	28
A	B	C	A	27
A	C	D	B	30
D	B	B	B	
	25	30	24	

(b)

A	B	A	B	B	18
B	B	E	C	D	21
A	B	B	A	B	18
C	B	C	B	C	19
E	B	D	E	D	26
27	10	25	23	17	

This one is more difficult.

(c)

A	A	A	A	24
C	A	C	D	13
A	B	B	A	18
B	B	D	C	12
	18	15	18	

(d)

A	B	B	A	22
A	A	B	B	22
A	B	A	B	22
B	B	A	B	17
27	17	22	17	

Multiplication and division vocabulary

Term	Definition	Example
factor	a number that divides exactly into another number	factors of 12 = 1, 2, 3, 4, 6, 12
common factor	factors of two numbers that are the same	common factors of 8 and 12 = 1, 2, 4
prime number	a number with only 2 factors: 1 and itself	2, 3, 5, 7, 11, 13, 17, 19...
composite number	a number with more than two factors	12 (it has 6 factors)
prime factor	a factor that is prime	prime factors of 12 = 2, 3
multiple	a number in another number's times table	multiples of 9 = 9, 18, 27, 36...
common multiple	multiples of two numbers that are the same	common multiples of 4 and 6 = 12, 24...
square numbers	the result when a number has been multiplied by itself	25 ($5^2 = 5 \times 5$) 49 ($7^2 = 7 \times 7$)
cube numbers	the result when a number has been multiplied by itself 3 times	8 ($2^3 = 2 \times 2 \times 2$) 27 ($3^3 = 3 \times 3 \times 3$)

Roman numerals

1	I	100	C
5	V	500	D
10	X	1000	M
50	L		

TRANSITION MATHS KNOWLEDGE ORGANISER

Measurement conversions

Month	Days
January	31
February	28 (29 in leap year)
March	31
April	30
May	31
June	30
July	31
August	31
September	30
October	31
November	30
December	31

1 year = 365 days (\approx 52 weeks)
Leap year = 366 days

1 centimetre	10mm
1 metre	100cm
1 kilometre	1,000 m
1 mile	1.6 km
1 kilometre	0.625 ($\frac{5}{8}$) mile
1 kilogram	1,000 grams
1 litre	1,000 millilitres

Co-ordinates

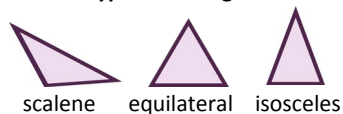
Read co-ordinates along the x axis (horizontal) first, then the y axis (vertical). E.g. (3,-4) = go right 3, down 4.

2D shapes

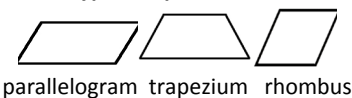
Name	No. of sides
quadrilateral	4
pentagon	5
hexagon	6
heptagon	7
octagon	8
nonagon	9
decagon	10

polygon = shape with straight sides
regular = all sides/angles the same
irregular = sides/angles **not** same

Types of triangle



Types of quadrilateral



AREA

is the amount of space inside a 2D shape usually measured in cm^2 or m^2 .

Area of a triangle

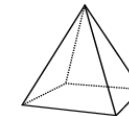
$$= (\text{base} \times \text{height}) \div 2$$

Area of a parallelogram

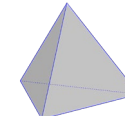
$$= \text{base} \times \text{height}$$

(Height = perpendicular height)

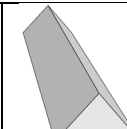
3D shapes



square-based pyramid



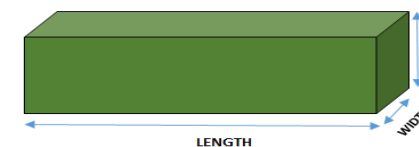
triangular-based pyramid



triangular prism

faces (the flat sides)	5	4	5
edges	8	6	9
vertices (the points where the edges meet)	5	4	6

Volume = the amount of space a 3D shape takes up, usually measured in cm^3 or m^3



$$\text{Volume of a cuboid} = \text{length} \times \text{width} \times \text{height}$$

Fractions, decimals & percentages

$\frac{1}{100}$	0.01	1%	$\div 100$
$\frac{1}{20}$	0.05	5%	$\div 20$
$\frac{1}{10}$	0.1	10%	$\div 10$
$\frac{1}{5}$	0.2	20%	$\div 5$
$\frac{1}{4}$	0.25	25%	$\div 4$
$\frac{1}{2}$	0.5	50%	$\div 2$
$\frac{3}{4}$	0.75	75%	$\div 4, \times 3$
1	1	100%	$\div 1$

Angles

full turn	360°
half turn	180°
right angle	90°
acute angle	$< 90^\circ$
obtuse angle	$> 90^\circ$
reflex angle	$> 180^\circ$
angles on a straight line	180°
angles inside a triangle	180°
angles inside a quadrilateral	360°

Shape vocabulary

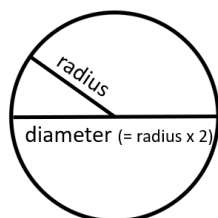
perimeter = measure around the edge (**circumference** = perimeter of a circle)

horizontal line

parallel lines

vertical line

perpendicular lines
(at right angles)



The mean

The mean is a type of average. To find the mean, add up all the numbers and divide by how many there are. E.g. the mean of 4, 5, 3, 4 is 4.
(Because $4 + 5 + 3 + 4 = 16$, and $16 \div 4 = 4$)