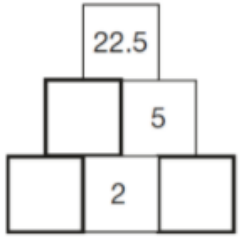
Essential Maths Facts for Year 6

Example SATs questions

Here is a number pyramid.

The number in a box is the **product** of the two numbers below it.

Write the missing numbers.



4 This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the **combined height** of the other two mountains?

A shop sells batteries in **packs of four** and **packs of two**.

Simon and Nick want two batteries each.

They buy a **pack of four** and share the cost equally.

How much does each pay?

4 This table shows the number of people living in various towns in England.

Town	Population
Bedford	82,448
Carlton	48,493
Dover	34,087
Formby	24,478
Telford	166,640

What is the **total** of the numbers of people living in Formby and in Telford?

What is the **difference** between the numbers of people living in Bedford and in Dover?

4 Operations Key Language

+	-
Sum	Less
Find the sum of	Less than
Plus	Leave
Total	Difference
Find the total of	Find the difference
Add	What is the difference be-
More than	tween
Make	Minus
Addition	Subtract
Altogether	Take away
Together	Take from
And	Fewer
More than	Left
Total	How much more
Cobined	

x	÷	=
Multiply	Divide	Equal to
product	Divided by	Equals
Groups of	Divided into	The same as
Lots of	Divided equally	
Multiplication	Share equally	
Multiplied by	Share	
Times	Equal groups of	
Multiple of		
Repeated addition		

Times Tables

A strong knowledge of your times tables and their related division facts is essential for maths. They should be practised regularly and should be learnt out of order for easy re-call. These can be practised via TT Rockstars.

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

Learning by rote is a popular way for children to recall their times table. The following link is on Youtube and has been popular with our Year 6 children.
https://www.youtube.com/watch?v=jf2BHuSbt_Y
Alternatively, type in 'Year 3 Rolling Numbers.'

Example SATs questions

Write three factors of 30 that are **not** factors of 15

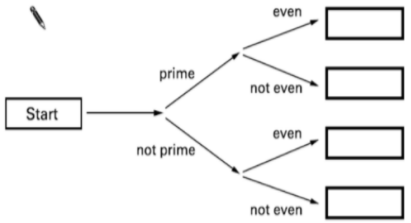
Write **all** the common multiples of 3 and 8 that are **less than 50**

Here is a diagram for sorting numbers.

Write these three numbers in the correct boxes.

You may not need to use all of the boxes.

9 17 20



Write **all** the numbers between 50 and 100 that are **factors of 180**

1 Here is a diagram for sorting numbers.

Write **one number** in each box

One is done for you.

	multiple of 5	**not** a multiple of 5
multiple of 3	30	
not a multiple of 3		

Factors and Multiples

Factors are all the numbers which, when multiplied together in pairs, produce the original number. i.e.

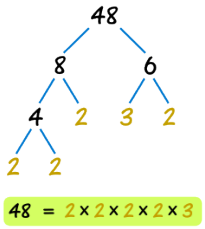
The factors of 12 are:

1 and 12 (1x12=12)
2 and 6 (2x6=12)
3 and 4 (3x4=12)

Numbers which have only one pair of factors (1 and itself) are known as prime numbers: 17 is prime number because the only pair of factors are 1 and 17.

Common factors—these are numbers which are factors for two different numbers i.e. the common factors of 12 and 20 are 1, 2 and 4 because these number divide exactly into both original numbers. This is important when working with fractions.

Prime factors are the factors of a given number which, when taken to its full extent, are prime. They can be shown as a prime factor tree and, when all of them are multiplied together, they will produce the original number.



Tip:
Factors are always the number or smaller
Multiples are always the number or bigger.

Multiples

Multiples are effectively extended times tables. The multiples of any number are the numbers into which the original number can be divided exactly. For example:

The multiples of 2 are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 and any other number which can be divided by 2.

The multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80 and any other number which can be divided by 5.

Common multiples are the multiples which apply to two different numbers. I.E. the common multiples for 3 and 4 below 30 are:

312 and 24 as these are multiples for both 3 and 4.

Example SATs questions

Write the missing numbers to make this **multiplication** grid correct.

×		
9	63	54
	56	48

The number **20** goes in **two** of the squares of this multiplication grid.

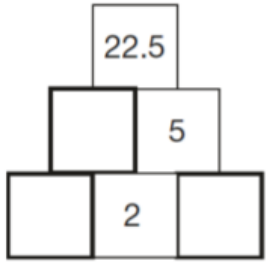
Tick (✓) the two squares where 20 goes.

×	1	2	3	4	5
1					
2					
3					
4					
5					

Here is a number pyramid.

The number in a box is the **product** of the two numbers below it.

Write the missing numbers.



167 × 4 =

0.9 × 200 =

Explain how you can use this fact to find the answer to **18 × 326**

5,542 ÷ 17 = 326

A group of friends earns £80 by washing cars.

They share the money **equally**.

They get £16 each.

How many friends are in the group?

581 ÷ 7 =

Time

Simple Facts

- 60 seconds in a minute
- 60 minutes in an hour
- 24 hours in a day (12 hours in half a day)
- 7 days a weeks
- 52 weeks in a year
- 4 weeks in a month (roughly)
- 365 days in a year
- 366 days in a leap year (once every four years)
- In a leap year February has one additional day.

30 days hath September,
April, June and November
All the rest have 31,
Except for February alone,
Which has 28 days clear,
And 29 in each leap year.

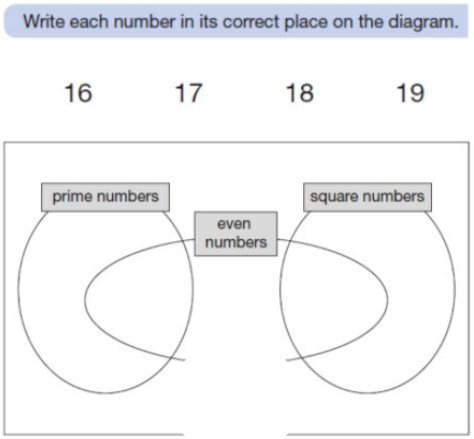
Months of the Year (in order)

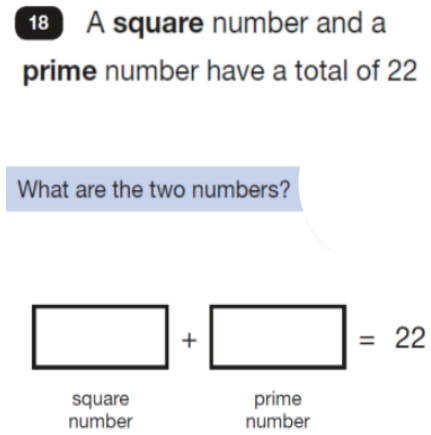
January
February
March
April
May
June
July
August
September
October
November
December

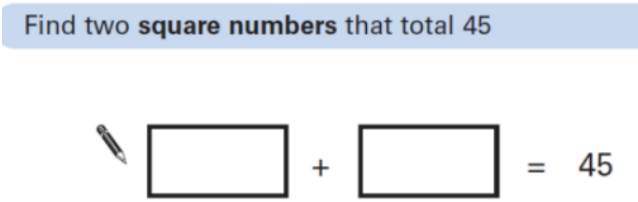
Purchasing analogue watch for your child can be extremely helpful for them to learn the time. Often, children can read digital time but cannot convert this knowledge when looking at an analogue clock in their everyday life.

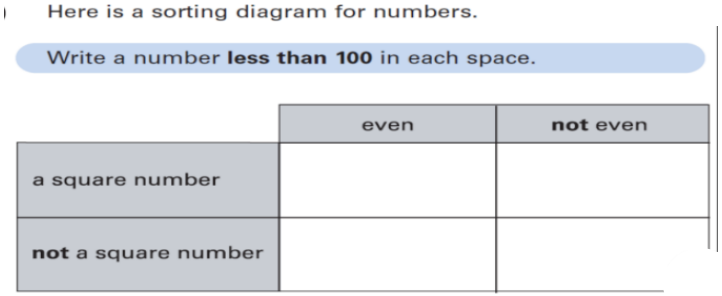
12 Midnight = 00.00	12 Noon / midday = 12.00
1 am = 01.00	1pm = 13.00
2am = 02.00	2pm = 14.00
3am = -3.00	3pm = 15.00
4am = 04.00	4pm = 16.00
5am = 05.00	5pm = 17.00
6am = 06.00	6pm = 18.00
7am = 07.00	7pm = 19.00
8am = 08.00	8pm = 20.00
9am = 09.00	9pm = 21.00
10am= 10.00	10pm = 22.00
11am = 11.00	11pm = 23.00

Examples of SATs questions









Squares, Cubes and Primes

Square numbers are the result when a root number is multiplied by itself i.e. 5 squared (5^2) is 5x5 = 25. 25 is a square number.
Cube numbers are the result of a root number being multiplied byt itself and the answer being multiplied byt the root number again i.e 5 cubed (5^3) is 5x5x5 = 125

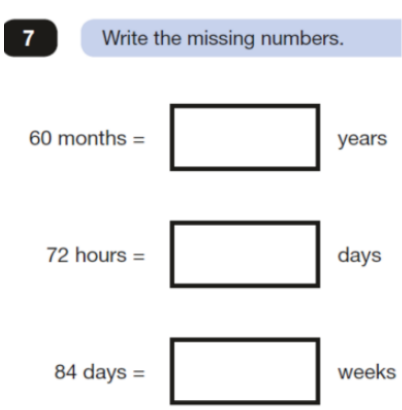
Root number	Squared	Cubed
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000
11	121	1331
12	144	1728

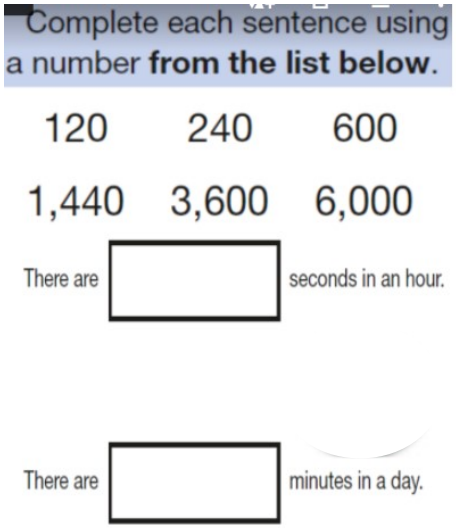
Prime numbers are those numbers which only have 1 and itself as factors.
2 is the only even prime number.
1 is not a prime number.

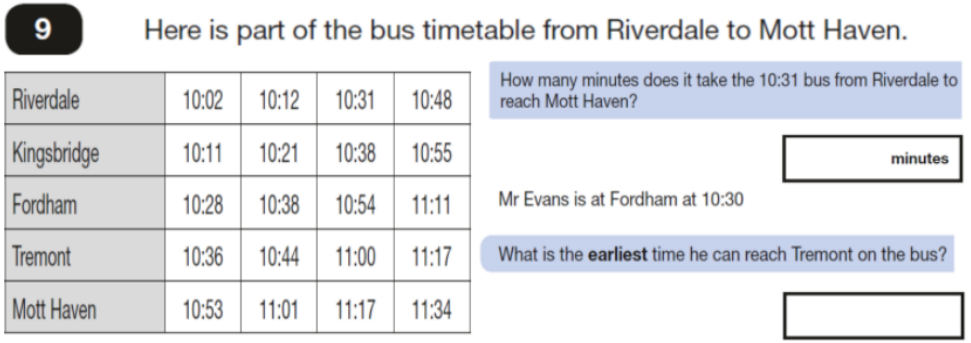
Prime Numbers are infinite but the primes below 100 are:

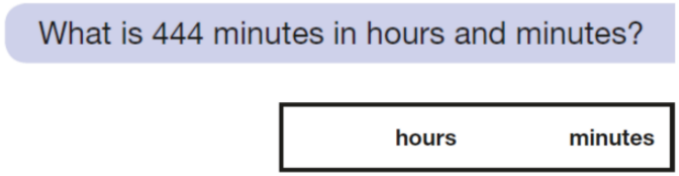
2, 3, 5, 7,
11, 13, 17,
23,
31, 37,
41, 43, 47,
53, 59,
61, 67,
71, 73, 79,
83, 89,
97

Example SATs time questions:





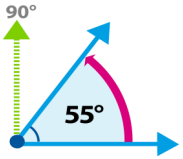




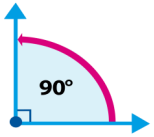
Angles

- The angles on a straight line add up to 180°
- The angles around a point add up to 360°
- Internal angles of a triangle add up to 180°
- The angles of a quadrilateral add up to 360°
- Other 2d shapes—for every additional angle add a further 180°
  (Pentagon, 5 angles = 360° +180° = 540°, hexagon, 6 angles = 540° + 180° = 720°, and so on)
  The formula (n-2) x 180 can be used to calculate the interior angles of any regular shape (n= the number of sides on the shape)

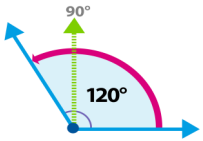
Acute angle = less than 90°



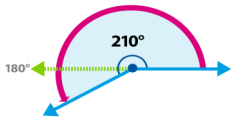
Right angle = 90°



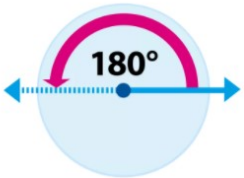
Obtuse angle = greater than 90° but less than 180°



Reflex angle = greater than 180°

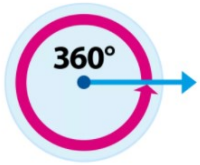


Half turn or angle on a straight line



Half turn

Full turn



Full turn

Example SATs questions

Complete this table to show the numbers to the **nearest 100**

	rounded to the nearest hundred
316	300
3162	
31628	
316281	

Amy chooses two of these cards.

11	23	33	43

She adds the numbers on her two cards together.
She rounds the result to the nearest 10

Her answer is 60

Which two cards did Amy choose? ☐ and ☐

Write in the missing numbers.

Number	Rounded to the nearest **whole** number
5.05	
5.55	
4.45	
4.54	

Rounding

Rounding is skill which can be extremely useful when estimating answers to complex calculations but it also a skill tested within SATs papers.

TH	H	T	U	.	ths
2	4	6	5	.	9

To round to the nearest ten first we must look at the tens column. We have 6 tens so we know the number will either round up to 2470 or down to 2460. Next we must look in the units column. If it is 5 or more then we round up, if it is 4 or less we round down. As 5 is in the units, we round up to 2470.

This procedure follows for rounding to nearest thousand, hundred, unit, or tenth. The only thing that alters is the column we look in so:

2465.9 rounded is:

2000—to the nearest thousand
2500—to the nearest hundred
2470—to the nearest ten
2455—to the nearest unit

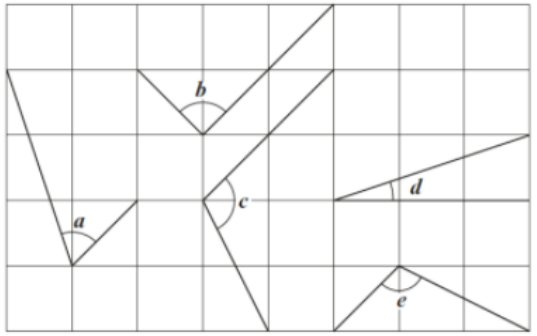
Rounding to the nearest tenth/hundredth.
Example:

3.456 rounded to 2 decimal places/nearest hundredth = 3.46
3.456 round to 1 decimal place/nearest tenth = 3.5

Example SATs angles questions:

13 Circle the **pentagon** with exactly **four acute angles.**

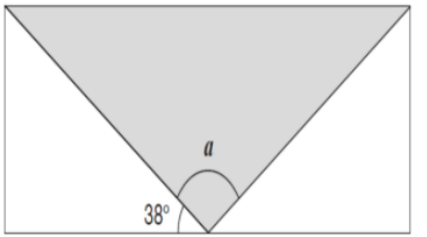
7 Here are five angles marked on a grid of squares.



Write the letters of the angles that are **obtuse.**

Write the letters of the angles that are **acute.**

15 A shaded **isosceles** triangle is drawn inside a rectangle.

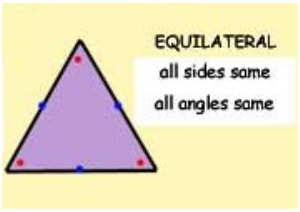


Not to scale

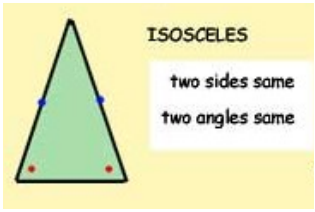
Calculate the size of angle ***a***.

2d Shape

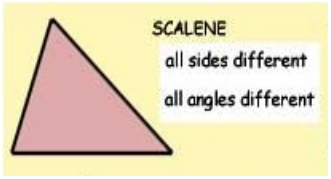
Equilateral Triangle
All sides and internal angles are equal



Isosceles Triangle
2 equal length sides and 2 equal angles

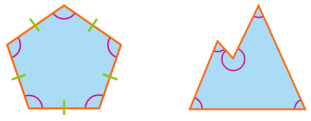


Scalene Triangle
All 3 sides are different lengths, all angles are different.

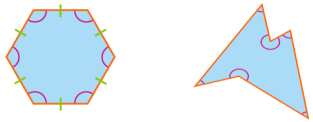


Regular shapes - shapes which have equal length sides and equal angles
Irregular Shapes—shapes which have unequal length sides and unequal angles.

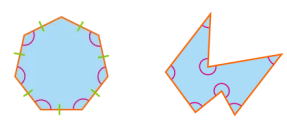
Pentagon—5 sides
Regular Irregular



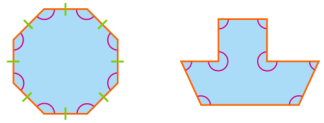
Hexagon—6 sides
Regular Irregular



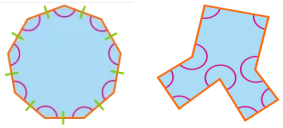
Heptagon—7 sides
Regular Irregular



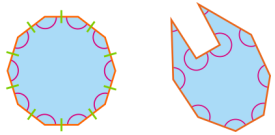
Octagon—8 sides
Regular Irregular



Nonagon—9 sides
Regulaar Irregular

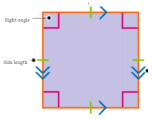


Decagon—10 sides
Regular Irregular

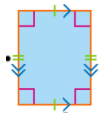


Quadrilaterals—4 sided shapes with straight lines

Square

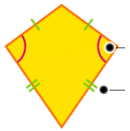


Oblong/Rectangle



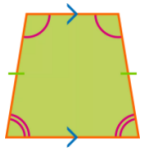
Rhombus

Kite



Parallelogram

Trapezium



Example SATs questions

Write the missing number to make this **division** correct.

$75 \div \square = 7.5$

Complete these calculations.

15 × 100 = ☐

☐ × 10 = 1500

☐ ÷ 100 = 150

150 ÷ 10 = ☐

Here are five number cards.

0.47 | 10 | 100 | 1000 | 4.07

Use **four** of the cards to complete these calculations.

47 ÷ ☐ = ☐

☐ × ☐ = 40.7

2,345 × 1,000 =

Place Value and multiplying/dividing by 10, 100 and 1000

TM	M	HTH	TTH	TH	H	T	U	.	ths	hths	thths
Tens of Millions	Millions	Hundred of Thousands	Tens of Thousands	Thousands	Hundred	Tens	Units/ Ones	Decimal Point	Tenths	Hundredths	thousandths
4	2	7	5	6	4	6	2	.	5	4	3

Forty-Two million, seven hundred and fifty-six thousand four hundred and sixty-two point five four three

Multiplying by 10, 100 and 1000—count the zeroes then move the digits the same number of places to the left. The decimal point DOES NOT MOVE it is a fixed point. Gaps are plugged with a zero (you do not ADD a zero—ever!).

					4	5	3	.	6		
X10				4	5	3	6				
X100			4	5	3	6	0				
x1000		4	5	3	6	0	0				

Dividing by 10, 100 and 1000—count the zeroes the move the digits the same number of places to the right. The decimal point DOES NOT MOVE it is a fixed point. Gaps are plugged with a zero.

					4	5	3				
÷10						4	5	.	3		
÷100							4	.	5	3	
÷100							0	.	4	5	3

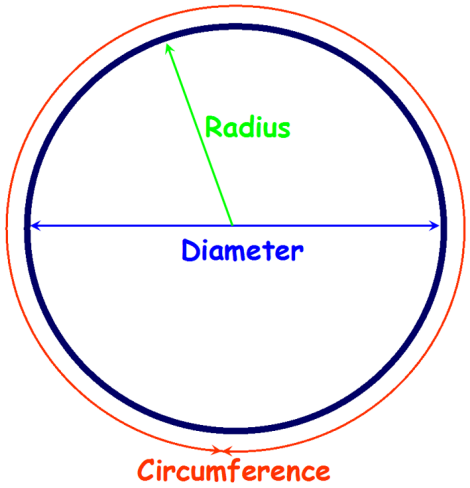
These facts can then be used to help with other calculations i.e. 50 x 70

5 x 7 = 35

50 x 7 = 350

50 x 70 = 3500

Circle

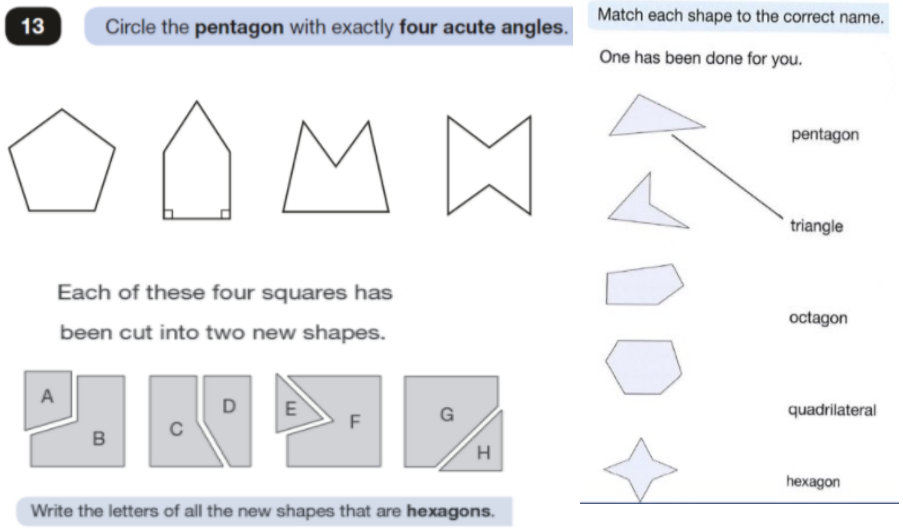


Circumference—the distance around the outside of the circle (it's perimeter).

Diameter—the width of the circle crossing the centre from one side to the other.

Radius—the distance from the centre of the circle to

Example SATs questions

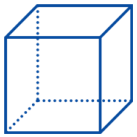


A bicycle wheel has a diameter of 64 cm.

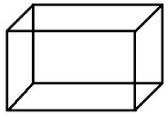
What is the **radius** of the bicycle wheel?

3d Shape

Cube



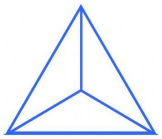
Cuboid



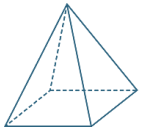
Cylinder

Cone

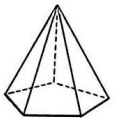
Triangular Based Pyramid



Square based pyramid



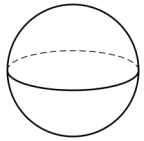
Pentagonal based pyramid



Triangular Prism

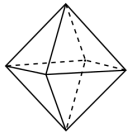
Hexagonal prism

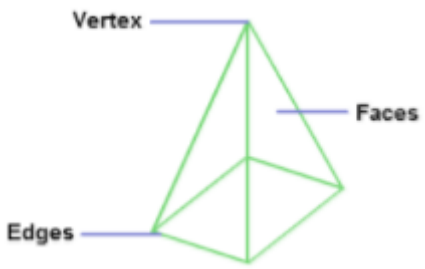
Sphere



Hemisphere

Octahedron





Vertex—the 'corners' of the shape.

Face—the side of the shape

Edge—the joint of two faces

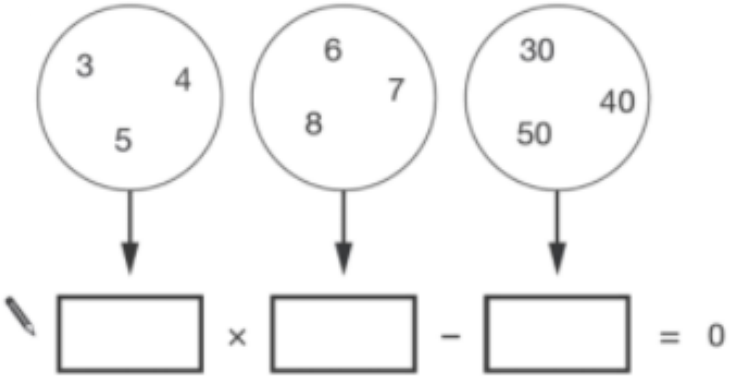
Example SATs questions

$3^2 + 10 =$

$50 + (36 \div 6) =$

$20 - 4 \times 2 =$

Write one number from each circle to make this calculation correct.



Write the correct sign **>**, **<** or **=** in each of the following.

$(10 + 5) - 9 \square (10 + 9) - 5$

$3 \times (4 + 5) \square (3 \times 4) + 5$

$(10 \times 4) \div 2 \square 10 \times (4 \div 2)$

BODMAS

BODMAS is the order in which operations within a calculation must be completed.

B = Brackets
O/I= Orders (also known as powers)/ Indices
D = Division
M = Multiplication
A = Addition
S = Subtraction

$7^2 \times 2 - (6 + 3) =$

Brackets first— 6 + 3 = 9
Orders/indices second—$7^2 = 49$
Division/Multiplication next—49 x 2 = 98
Addition/Subtraction last—98 - 9 = 89

You might not see all the BODMAS steps in one questions so you just need to figure which step must come first, for example:

60-42÷6 =

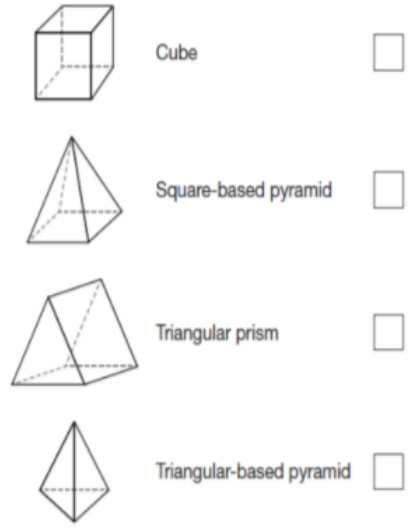
If completed in left to right order the answer would be 3—this is IN-CORRECT!

Under BODMAS 42 ÷6 must be completed first (42÷6 = 7) then this answer taken away from 60 so the CORRECT answer is 53.

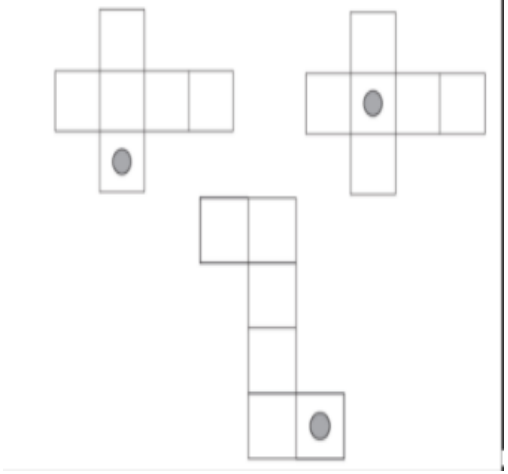
Example SATs questions

Here are diagrams of some 3-D shapes.

Tick each shape that has the same number of faces as vertices.

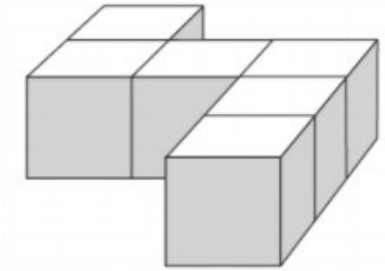


On each net draw **one more dot** so that each cube will have dots on **opposite** faces.



Emily has 6 cubes.

She sticks them together to make this model.



She paints the sides of the model grey all the way round.

She leaves the top and the bottom of the model white.

How many of the cubes in the model have **exactly two** faces painted grey?

Fractions, Decimals and Percentages

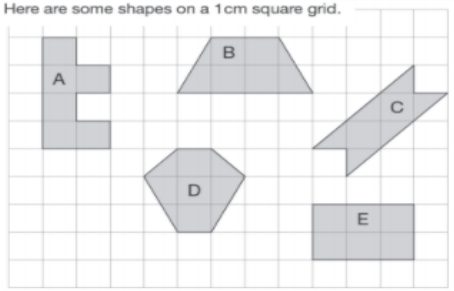
Fractions, decimals and percentages can be easily converted through the methods we have taught you at school but some of them need to be re-membered to help with speed during tests. This is especially helpful when ordering a mixture of fractions, decimals and percentages.

Fraction	Decimal	Percentage
1/2	0.5	50%
1/4	0.25	25%
3/4	0.75	75%
1/10	0.1	10%
1/5	0.2	20%
3/10	0.3	30%
2/5	0.4	40%
3/5	0.6	60%
7/10	0.7	70%
4/5	0.8	80%
9/10	0.9	90%
1/100	0.01	1%
2/100	0.02	2%
3/100	0.03	3%
4/100	0.04	4%
5/100	0.05	5%

Examples of SATs questions

Write the letter of the shape that has the **smallest area**.

Here are some shapes on a 1cm square grid.



What is the **perimeter** of shape A?

cm

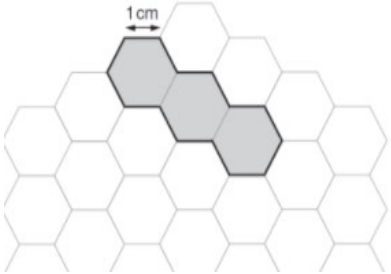
The perimeter of this rectangle is 50 centimetres.

Calculate the length of the rectangle.

Here is a grid of regular hexagons.

The shaded shape has an area of 3 hexagons and a perimeter of 14cm.

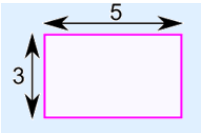
Draw another shape on the grid which has an **area** of 4 hexagons and a **perimeter** of 14cm.



Area, Perimeter and Volume

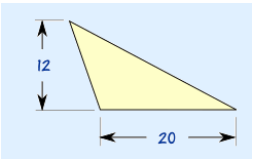
Area:

Area is the amount of space covered by a 2d shape. Area of a rectilinear shape (square, oblong) is calculated by the formula length x width. The area of a compound shape can be calculated by splitting the shape into its constituent parts, calculating their area and then adding them back together.



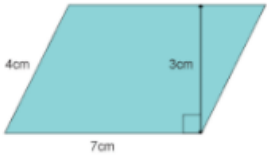
Assuming these are in cm 3cm x 5cm = 15cm²

Area of a triangle is calculated by the formula (base x height) ÷ 2



(12cmx20cm) ÷ 2 = 120cm²

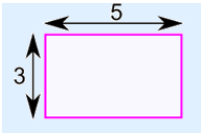
Area of a parallelogram is calculated by the formula base x height.



3cm x 7cm = 21cm²

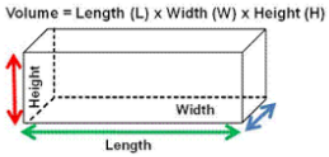
Perimeter is the total outside length of sides of a shape added together

So the perimeter for this shape would be 16cm as the two longer sides are 5cm and the two shorter sides are 3cm.



Volume is the internal space of a 3d object (i.e. how much it could contain). It is calculated by the formula length x width x height.

So if h = 3cm, width = 2cm and l = 6cm the volume would be:



3 x 2 x 6 = 36cm³

Example SATs questions

Write these in order of size, starting with the smallest.

$\frac{3}{4}$ 0.34 0.7 43%

smallest

17 In each box, circle the number that is **greater**.

$1\frac{1}{2}$ 1.2

$1\frac{5}{100}$ 1.4

$1\frac{1}{4}$ 1.3

$1\frac{3}{5}$ 1.5

Put a tick (✓) in **each row** to complete this table.

One has been done for you.

	greater than $\frac{1}{2}$	less than $\frac{1}{2}$
0.9	✓	
0.06		
$\frac{11}{20}$		
0.21		

20 Adam says,

0.25 is **smaller** than $\frac{2}{5}$

Explain why he is correct.

Fractions Pointers

When **simplifying fractions,** find a common factor for the numerator and denominator then (to simplify as far as possible) use:
"Whatever I do to the bottom, I must do to the top" .

When **converting an improper fraction to mixed number** divide the denominator into the numerator. The whole number will give you the 'whole' part of the mixed number, any remainders should be put over the original denominator as a fraction (and then simplified if needed).

Adding or subtracting fractions—the denominators MUST be the same. Convert using common multiples and "Whatever I do to the bottom, I must do to the top" .

Dividing fractions—remember 'Keep, change, flip' - KCF

Multiplying fractions by whole numbers— put a fraction line and 1 underneath the whole number and complete the calculation—multiply the numerators then multiply the denominators

When ordering fractions—convert all so they have the same denominator to make it easy to put them in order but remember to write the original fraction in the answer boxes.

Example SATs questions

At the end of a film, the year is given in Roman numerals.

Write the year MMVI in **figures**.

Here is a number written in Roman numerals.

CXV

Write the number in figures.

Roman Numerals

Arabic Numeral	Roman Numeral
1	I
2	II
3	III
4	IV
5	V
6	VI
7	VII
8	VIII
9	IX
10	X
20	XX
30	XXX
40	XL
50	L
60	LX
70	LXX
80	LXXX
90	XC
100	C
500	D
1000	M

Example SATs questions

Circle the fraction that is greater than $\frac{1}{2}$ but less than $\frac{3}{4}$

$\frac{7}{8}$ $\frac{2}{5}$ $\frac{1}{3}$ $\frac{5}{8}$ $\frac{3}{6}$

$\frac{4}{6} \times \frac{3}{5} =$

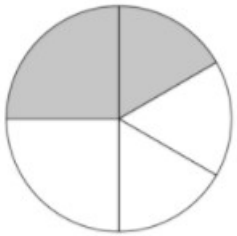
$\frac{5}{8} \div 2 =$

Two of the fractions below are **equivalent**.

Circle them.

$\frac{2}{3}$ $\frac{6}{10}$ $\frac{9}{12}$ $\frac{10}{15}$ $\frac{16}{20}$

23 In this circle, $\frac{1}{4}$ and $\frac{1}{6}$ are shaded.



What fraction of the whole circle is **not** shaded?

Write these fractions in order of size starting with the smallest.

$\frac{3}{4}$ $\frac{3}{5}$ $\frac{9}{10}$ $\frac{17}{20}$

smallest

Units of Measurement

Metric

Length/Distance	Weight/Mass	Volume
1km = 1000m	1 tonne = 1000kg	1L = 1000ml
1m = 100cm	1kg = 1000g	1L = 100cl
1cm = 10mm		1cl = 10ml
1m = 1000mm		
1/2 km=500m	1/2 tonne = 500kg	1/2L = 500ml
1/2 m = 50cm	1/2kg = 500g	3/4L = 750ml
1/2/cm = 5mm	3/4 kg = 750g	1/4 L = 250ml
3/4 km = 750m	1/4 kg = 250g	
3/4 m = 75cm		
3/4 cm = 7.5mm		
1/4/km = 250m		
1/4 m = 25cm		
1/4 cm = 2.5mm		

Imperial

1 mile = 1760 yards	1 stone = 14 pounds (lb)	1 gallon = 8 pints
1 yard = 3 feet	1 lb = 16 ounces (oz)	
1 foot = 12 inches		

Metric/Imperial conversion (rough)

2.5cm = 1 inch

8km = 5 miles

500g = 1lb

Example SATs questions