

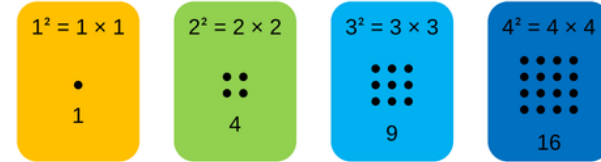
Year 8 - Mathematics - Spring Term



Key Word	Definition
Factor	A number that divides a given number exactly, leaving no remainder.
Multiple	The result of one number multiplied by another number.
Square Number	The answer when a number has been multiplied by itself.
Cube Number	The answer when a number is multiplied by itself and then by itself again.
Prime Numbers	A whole number that has exactly two factors.

Square Numbers:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, ...



The pattern of dots gives a clue as to where the name square numbers come from...

Multiplication Grid:

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Prime Number Grid:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Cube Numbers:

1 is the first cube number, because $1 \times 1 \times 1 = 1$

8 is the second cube number, because $2 \times 2 \times 2 = 8$

27 is the third cube number, because $3 \times 3 \times 3 = 27$

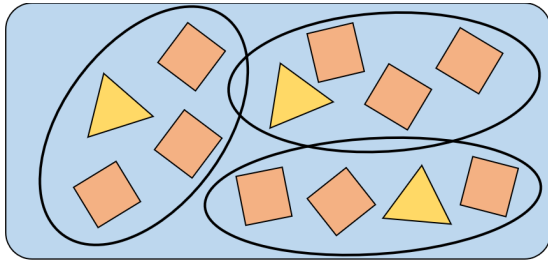
64 is the fourth cube number, because $4 \times 4 \times 4 = 64$



Year 8 - Mathematics - Spring Term: Number

Key Word	Definition
Ratio and Proportion	A multiplicative relationship between values.
Simplify	Using common factors to divide all the numbers in a ratio until they cannot be divided further.
Percentage	a number or ratio that can be expressed as a fraction of 100

Simplifying a Ratio



What is the ratio of **Triangles to Squares** ?

$$3 : 9$$

$$\downarrow$$

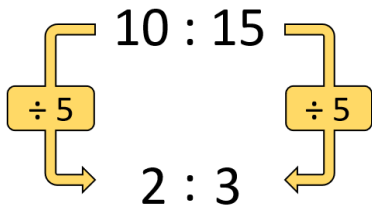
$$1 : 3$$

We can **simplify** this ratio.

"For every triangle there are 3 squares."

Simplify this ratio.

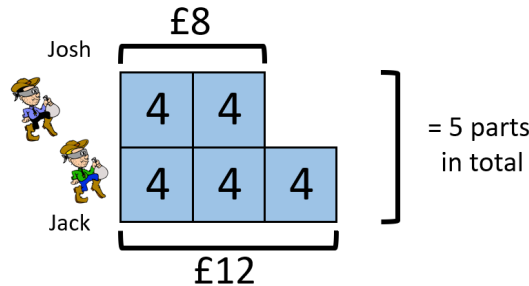
What **factor** are both numbers **divisible** by?



Sharing in a Ratio

Josh and Jack the bandits stole **£20** from the bank!
They divided it in the ratio **2 : 3**
How much did they each get?

Draw a **Bar Model** to calculate how much **one part** is worth. $£20 \div 5 = £4$ per part



So Josh gets **£8** and Jack gets **£12**.

Percentages

Use the following methods to work these key percentages **without** a calculator

Percentage	Non Calc Method
10%	$\div 10$
5%	$\div 10 \div 2$
1%	$\div 100$
25%	$\div 4$
50%	$\div 2$

Calculator Method

Use the following methods to work these key percentages **with** a calculator

$$\frac{\text{Percentage}}{100} \times \text{amount}$$

Example 1

Find 24% of 50

$$\frac{24}{100} \times 50 = 12$$

Example 2

Increase **£120** by 36%

$$100\% + 36\% = 136\%$$

$$\frac{136}{100} \times 50 = \text{£163.20}$$

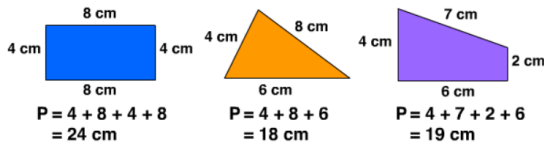


Year 8 - Mathematics - Spring Term: Geometry

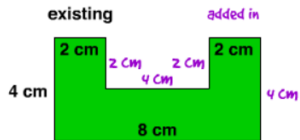
Key Word	Definition
Perimeter	The distance around the outside of a shape
Area	The amount of space inside a 2D shape
Similar	When one shape is an enlarged version of another
Congruent	Two shapes that are mathematically identical to each other.

Perimeter

The perimeter of a shape is the sum of the length of all its sides.



Some lengths may not be shown on examples. Don't forget to add them in when calculating perimeter.



$$P = 4 + 2 + 2 + 4 + 2 + 2 + 4 + 8 = 28 \text{ cm}$$

The perimeter of a regular polygon is the number of sides multiplied by the length of one side.

$$P = n \times l$$

$P =$ perimeter $n =$ number of sides $l =$ length of one side



Area

Name	Shape	formula for area
Rectangle		base x height
Square		base x height
Triangle		base x perpendicular height $\div 2$
Trapezium		$\frac{(a+b) \times \text{height}}{2}$
Parallelogram		base x perpendicular height
Rhombus		length x height $\div 2$
circle		πr^2
Equilateral Triangle		$\frac{\sqrt{3}}{4} b^2$

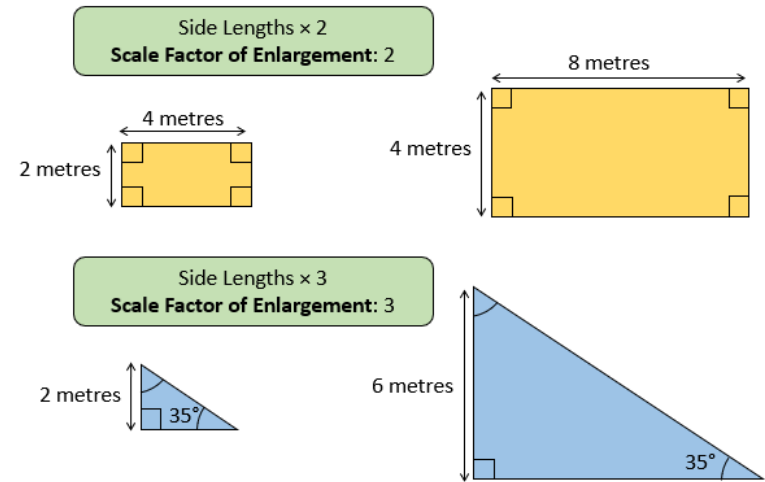
Congruent Shapes

Below are the **four ways** to prove two shapes are congruent:

<p>SSS (Side – Side – Side)</p> <p>3 sides are respectively equal</p>	<p>SAS (Side – Angle – Side)</p> <p>2 sides and the included angle are respectively equal</p>
<p>ASA (Angle – Side – Angle)</p> <p>2 angles and the included side are respectively equal</p>	<p>RHS (Right angle – Hypotenuse – Side)</p> <p>Hypotenuse and one side are respectively equal</p>

Similar Shapes

When we enlarge shapes, interior angles don't change, only the side lengths. How has each shape been enlarged?





Year 8 - Mathematics - Spring Term: Geometry

Key Word	Definition
Linear Graph	A straight line graph.
Gradient	How steep a line is.
Y Intercept	Where the graph crosses the Y-axis.
Translate	Moves a shape left, right, up, or down but does not turn.
Reflect	Where an object is flipped to create a mirror image.
Rotate	The motion of an object around a centre.
Enlarge	Where the original shape is made bigger or smaller by multiplying it by a scale factor.

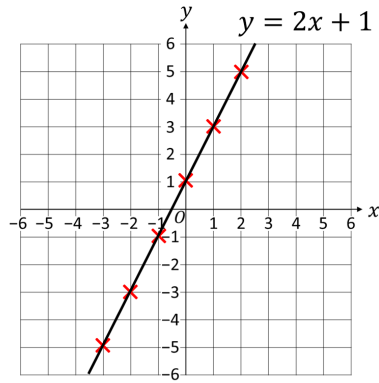
Linear Graphs

Draw the graph of:

$$y = 2x + 1$$

$$2 \times -3 + 1 = -5$$

x	-3	-2	-1	0	1	2	3
y	-5	-3	-1	1	3	5	7

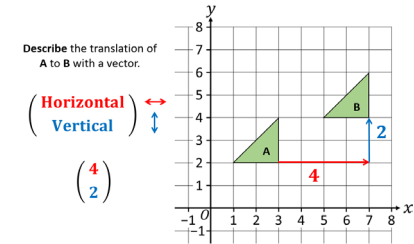


Plot the above co-ordinates on the grid:

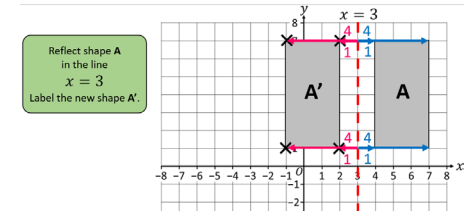
(-3,-5) (-2, -3) (-1, -1) (0, 1) (1, 3) (2, 5) (3, 7)

Transformations

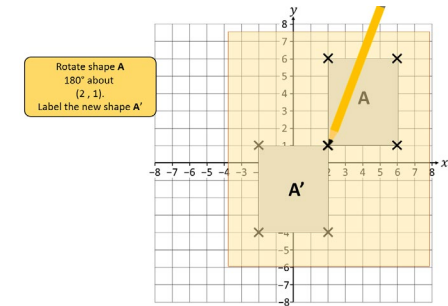
Translation



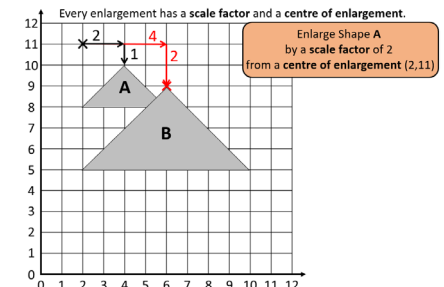
Reflection



Rotation











Enlargement








Year 8 - Mathematics - Spring Term: Calculator Skills

Important buttons on your calculator:

- **Equals button** → 
 - **Power of 2** - e.g. $3^2 = 9$ → 
 - **Any power** - e.g. $2^3 = 8$ → 
 - **Square root** - e.g. $\sqrt{16} = 4$ → 
 - **Any root** - e.g. $\sqrt[3]{27} = 3$ → 
 - **Fraction button** - e.g. $\frac{3}{4}$ → 
 - **Pi button** - e.g. π →  
- (This one is in blue above the number 7 so we must press the blue shift button first!)

Helpful Hints

- Convert your answer to a decimal use the **FORMAT** button and select "decimal." → 
- Use the delete button to remove a mistake rather than deleting the whole thing. → 
- Use the keypad to move the cursor around the calculation you have typed in on the screen. → 

Check

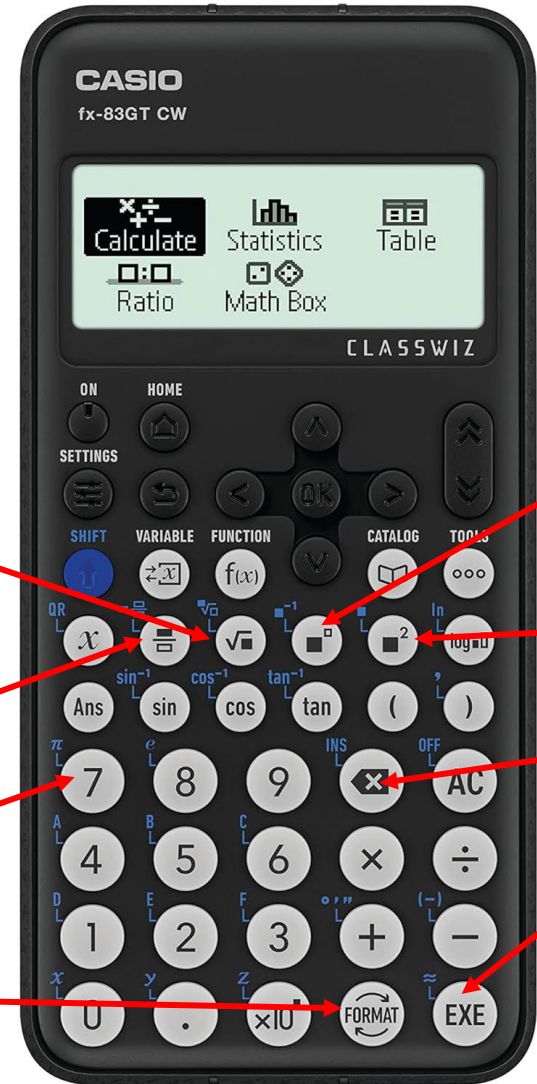
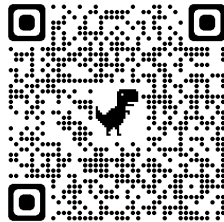
Can you type these questions in your calculator and get the following answers...

1) $8.3^3 = 571.787$

2) $\frac{7.5^2 - 1.2}{5} = 11.01$

3) $\sqrt{37} - 1.71 = 4.37276253$

Use the QR code to watch a short video on how to use your calculator



- Any Power
- Power of 2
- Delete button
- Equals button
- To convert to a decimal
- Pi button (shift first)
- Fraction button
- Square root