

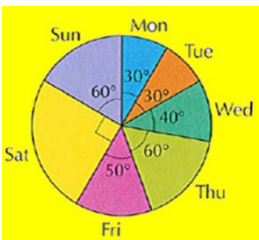
1. Statistics	
Mode	The number which appears most often in a set of numbers.
Bi-modal	If there are two modes (two numbers which appear most)
No mode	If one number does not appear more times than any other
Median	The number in the middle of the set when the numbers are listed in ascending order. If there are two numbers in the middle then calculate the number in the middle of them.
Range	Find the largest and smallest numbers in the list and subtract them.
Mean	Add up the numbers and divide by how many there are.

2.Data	
Extreme Value	A value much bigger or smaller than the other value
Discrete Data	Data that can only take particular values e.g. shoe size
Continuous Data	Can be measured and can take any value e.g. mass
Frequency	The number of times a value occurs


3.Pie Charts and Graphs

Pie Chart

- ⇒ Divided into sections called sectors. Each sector represents a fraction of the data.
- ⇒ Label each of the sectors with the angle and what it represents.



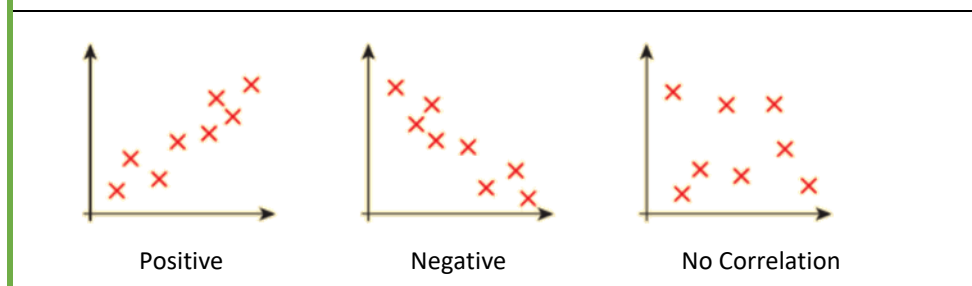
Graphs



- Label axes
- Gaps between bars
- Consistent scale on y axis
- Use a pencil and ruler

4.Scatter Graphs

Scatter Graphs - there are three types of correlation



5.Title:

Multiple	A multiple of a number is something in that numbers times table.
Factor	A factor is a whole number that divides exactly into another number
Highest Common Factor	The highest common factor (HCF) of two numbers is the largest number that is a factor of both numbers.
Lowest Common Multiple	The lowest common multiple (LCM) of two numbers is the smallest number that is a multiple of both numbers.
Prime	A prime number has exactly two distinct factors; 1 and itself. 1 is NOT a prime number.
Prime Factor decomposition	All numbers can be written as a product of primes. This is called prime factor decomposition . Use prime factor decomposition to find the HCF or LCM of a set of numbers.
Index Notation	Index notation collects factors together and writes them as a power, e.g $2 \times 2 \times 2 \times 2 = 2^5$. Index notation saves space.

The symbol 2 means 'square' or multiply a number by itself.

The symbol $\sqrt{\quad}$ means square root.

$1^2 = 1$	$7^2 = 49$	$\sqrt{144} = 12$
$2^2 = 4$	$8^2 = 64$	$\sqrt{100} = 10$
$3^2 = 9$	$9^2 = 81$	$\sqrt{49} = 7$
$4^2 = 16$	$10^2 = 100$	$\sqrt{36} = 6$
$5^2 = 25$	$11^2 = 121$	$\sqrt{4} = 2$
$6^2 = 36$	$12^2 = 144$	$\sqrt{1} = 1$

The symbol 3 means 'cube' or multiply a number by itself and by itself again.

The symbol $\sqrt[3]{\quad}$ means cube root.

$1^3 = 1$	$\sqrt[3]{1} = 1$
$2^3 = 8$	$\sqrt[3]{8} = 2$
$3^3 = 27$	$\sqrt[3]{27} = 3$
$4^3 = 64$	$\sqrt[3]{64} = 4$
$5^3 = 125$	$\sqrt[3]{125} = 5$

1)

Key words	Description	Examples
Algebraic expression	Contains letters and numbers	$3x + 2y$, $10m - 4n$
Term	Each part of an algebraic expression is a term.	$3x$, $-6y$, z^2
Like terms	Contain exactly the same letters (or no letter)	$3k$, $4k$, $-8k$
Identically equal	Two expressions which are always equivalent.	$a + 2b \equiv 2b + a$

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- 2)
- Do not write a multiplication sign in algebra, $p \times q$ is written as pq .
 - Write letters in alphabetical order.
 - Write numbers before letters.
 - $2 + 3 = 5$ and similarly $2a + 3a = 5a$
 - $2 \times 2 \times 2 = 2^3$ and similarly $b \times b \times b = b^3$
 - When multiplying terms together, multiply the number parts together and the letter parts together, e.g. $2a \times 3b = 2 \times 3 \times a \times b = 6ab$
- 156

- 3) A formula is a general rule for a relationship between quantities.
- To use a formula:
- Write out the formula (if it is not given to you)
 - Write the value of each known letter, e.g. $a = 7$, $b = 3$, $c = 2$
 - Substitute the values into the formula
 - Perform any necessary calculations
 - Do any necessary rounding
 - Write the units
 - Always double check your answer
- Hegarty Maths Skills — 155

4)

Expand	Multiply every term inside the bracket by every number and letter outside the bracket.
Factorise	Find the common factors. Write the common factors outside the brackets. Write the remaining terms inside the brackets.

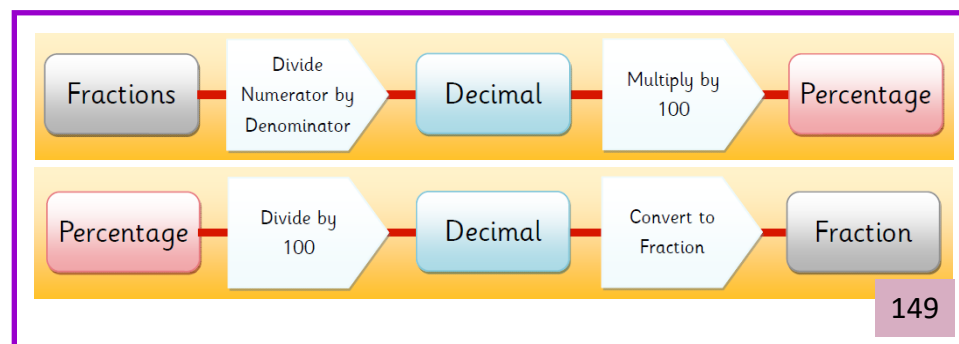
Factorising and expanding are inverse operations. Expanding removes brackets, and factorising puts them back in.

160&168

5) Equivalent fractions have the same value.

Multiplying	Write any mixed numbers as improper fractions. Multiply
Dividing	Write any mixed numbers as improper fractions. Invert the second fraction. Multiply.
Adding	Find a common denominator if you don't already have one. Add.
Subtracting	Find a common denominator if you don't already have one. Subtract

65-70



Mixed numbers are a combination of a fraction and integer, e.g. $3\frac{4}{5}$.

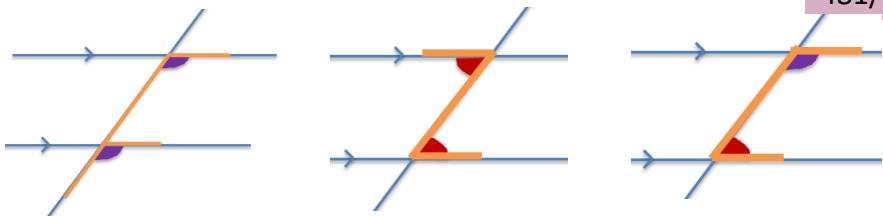
Improper fractions have a larger numerator than denominator. They are sometimes called top heavy fractions, e.g. $\frac{7}{3}$

You can convert between mixed numbers and top heavy fractions.

63&64

1) Angles in parallel lines

481/483



Corresponding angles are equal (F angles)

Alternate angles are equal (Z angles)

Interior angles add up to 180° (C angles)

2) Angle facts

479/485



$$a^\circ + b^\circ = 180^\circ$$

Angles on a straight line add up to 180°



Vertically opposite angles are equal



$$d^\circ + e^\circ + f^\circ = 360^\circ$$

Angles around a point add up to 360°



$$g^\circ + h^\circ + i^\circ = 180^\circ$$

Angles in a triangle add up to 180°



$$f^\circ + g^\circ + h^\circ + i^\circ = 360^\circ$$

Angles in a quadrilateral add up to 360°

3) Angles in polygons

Sum of interior angles = number of triangles $\times 180^\circ$

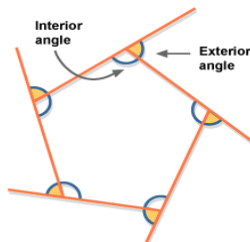
(Number of triangles = number of sides $- 2$)

Exterior angle = $360^\circ \div$ number of sides

Interior angle + exterior angle = 180°

Regular polygon = all sides and angles are equal

Irregular polygon = sides and angles are different sizes

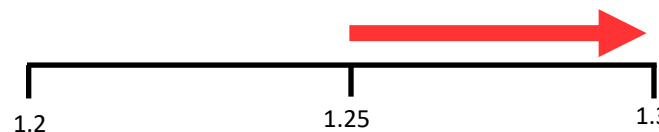


561/563

4) Rounding

Ascending	Order from smallest to largest
Descending	Order from largest to smallest
>	Greater than
<	Less than

When rounding, if it ends in 5 or more round up to the next number



129/626

5) Working with decimals

48&50

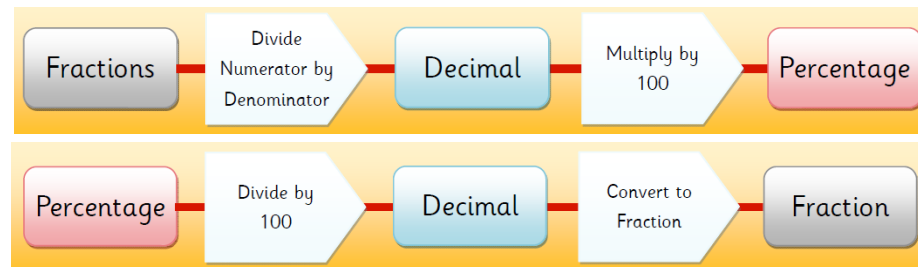
Add and subtract decimals using **column method**. Remember to line up your decimal points.

When **multiplying** decimals remember the answer should have the **same number of figures** after the decimal point as the total number of figures after decimal points in the question.

When **dividing** decimals keep **multiplying both numbers by 10** until you are **dividing by an integer** then use **bus stop method** or long division.

6) Fractions, decimals and percentages

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1) Function	A function is a rule.	
Inverse	Reverses the original function.	
Equation	An equation has an equals sign. An equation is a statement which says that what is on the left is equal to what is on the right.	
Balancing method	In an equation both sides of the equals sign have the same value. To keep the equation balanced you must do the same operation to both sides.	
Coefficient	The coefficient of x is the number multiplying x.	179+

2) To use Trial and Improvement to solve an equation: 321

- Estimate a value. Substitute it in to your equation. Is it too big or too small?
- Improve your estimate based on your findings in step 1. Try a new value.
- Keep improving your estimate until you get close to the answer required.

3) Conversions between metric and imperial units.

1 foot \approx 30 centimetres
 1 mile \approx 1.6 kilometres
 1 kilogram \approx 2.2 pounds
 1 litre \approx 1.75 pints
 1 gallon \approx 4.5 litres 705+

4) Metric units 691

1kilogram = 1000 grams
 1 tonne = 1000 kilograms
 $1m^2 = 10000cm^2$
 1 hectare = 10000m²

5) Ratio	A way of comparing two or more quantities.
Equivalent ratios	Equivalent ratios show the same proportion. One is a multiple of the other.
Simplifying a ratio	You can make the numbers in a ratio as small as possible by dividing the numbers in the ratio by their highest common factor.

- Ratios in their simplest form do not have units.
- To simplify a ratio involving measures, first convert the measures to the same units.
- For a ratio with fractions or decimals first multiply both sides of the ratio to get integers. 329+

6) Ratio	Compares part to part.	
Proportion	Compares part to whole.	
Proportions	Can be written as fractions or percentages.	
Direct Proportion	When two quantities are in direct proportion, as one increases or decreases, the other increases or decreases in the same ratio.	
Inverse proportion	When two quantities are in inverse proportion, as one increases, the other decreases in the same ratio.	
Unitary Method	Find the value of one part.	339+

7) The symbol ² means 'square' or multiply a number by itself. The symbol $\sqrt{\quad}$ means square root.

The symbol ³ means 'cube' or multiply a number by itself and by itself again. The symbol $\sqrt[3]{\quad}$ means cube root.


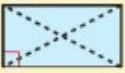





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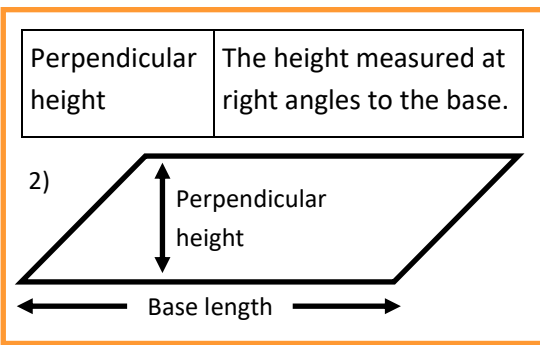
8) Powers of 10

$10^0 = 1$	$10^4 = 10000$	$10^{-1} = 0.1$	Negative powers do not mean negative numbers!
$10^1 = 10$	$10^5 = 100000$	$10^{-2} = 0.01$	
$10^2 = 100$	Any number with an index of 0 is equal to 1.	$10^{-3} = 0.001$	
$10^3 = 1000$		$10^{-4} = 0.0001$	
		$10^{-5} = 0.00001$	

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Square  <ul style="list-style-type: none"> all sides are equal in length opposite sides are parallel all angles are 90° diagonals bisect each other at 90° 	Rectangle  <ul style="list-style-type: none"> opposite sides are equal in length opposite sides are parallel all angles are 90° diagonals bisect each other
Rhombus  <ul style="list-style-type: none"> all sides are equal in length opposite sides are parallel opposite angles are equal diagonals bisect each other at 90° 	Parallelogram  <ul style="list-style-type: none"> opposite sides are equal in length opposite sides are parallel opposite angles are equal diagonals bisect each other
Kite  <ul style="list-style-type: none"> 2 pairs of sides are equal in length no parallel sides 1 pair of equal angles diagonals bisect each other at 90° 	Trapezium  <ul style="list-style-type: none"> 1 pair of parallel sides
1)	Isosceles trapezium  <ul style="list-style-type: none"> 2 sides are equal in length 1 pair of parallel sides 2 pairs of equal angles

6)	584+
Surface Area	The total area of all the individual faces added together.
Volume	The amount of 3D space a shape takes up.
Units for volume	mm ³ , cm ³ , m ³



3) Metric units

1 metre = 100 cm

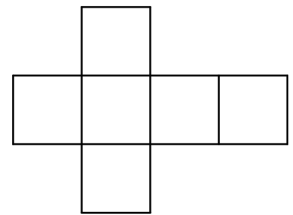
1 cm = 10 mm

1m² = 10000cm²

1 millilitre = 1cm³

1 litre = 1000cm³

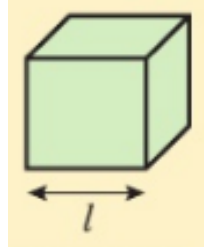
5)

Net	A 2D shape that folds to make a 3D solid.
Example net of a cube	

833+

7)

Volume of a cube = length cubed = l³



4)

Square
A = l²
Length, L

Rectangle
A = lw
Length, L
Width, w

You will need to learn these formulae and be able to recite and use them in examinations.

Triangles
A = 1/2 bh
Height, h
Base, b

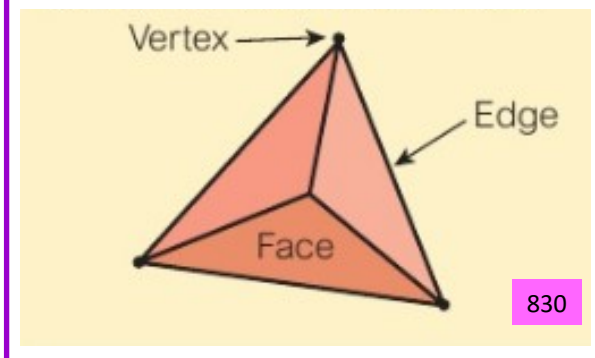
Parallelogram
A = bh
Height, h
Base, b

Remember for Area: Use Perpendicular height

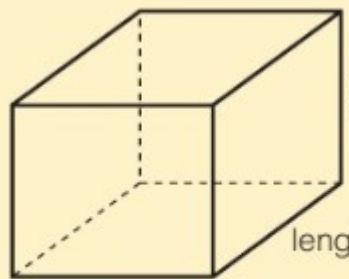
Trapezium
A = 1/2 (a + b)h
Height, h
Length, a

Circle
C = πd
C = 2πr
Radius, r
Diameter, d




Face	Flat surfaces of the shape.
Edge	Where two faces meet (the lines you draw to form the shape).
Vertex	Corner. Plural is vertices.



Volume of a cuboid = length x width x height = l x w x h = lwh

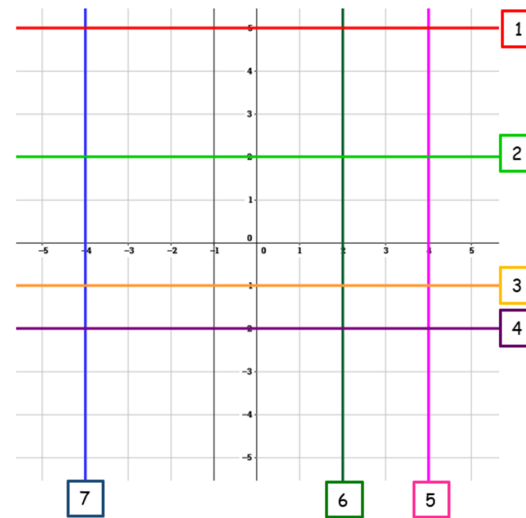


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1) Sequence	A set of numbers that follow a rule.
Term	Each number in a sequence is called a term.
Term-to-term rule	Tells you how to get from one term to the next.
Ascending sequence	Sequence with numbers that are increasing.
Descending sequence	Sequence with numbers that are decreasing.
Infinite	A sequence that carries on forever.
Finite	A sequence with a fixed number of terms.
Common difference	The difference between the terms. 197+
Pattern sequence	Explain how the sequence grows by describing how to get from one pattern to the next.
Example of pattern sequence	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Pattern 1</p> </div> <div style="text-align: center;">  <p>Pattern 2</p> </div> <div style="text-align: center;">  <p>Pattern 3</p> </div> </div>

3) Arithmetic sequence	Sequence where the terms go up and down in equal steps.
Position-to-term rule	Tells you how to work out a term in a sequence when you know its position.
Nth term	The position-to-term rule written algebraically. 198

Equation of a horizontal line	All points have the same y coordinate, eg $y = 3$. The line is parallel to the x axis.
Equation of a vertical line	All points have the same x coordinate, eg $x = -5$. The line is parallel to the y axis.
Drawing graphs	Write the numbers on the axes on the grid lines, not in the middle of the squares. Plot the coordinate points then draw a line right to the edge of the grid with a ruler through the points.
Label a graph	Write the equation of the line next to the line.

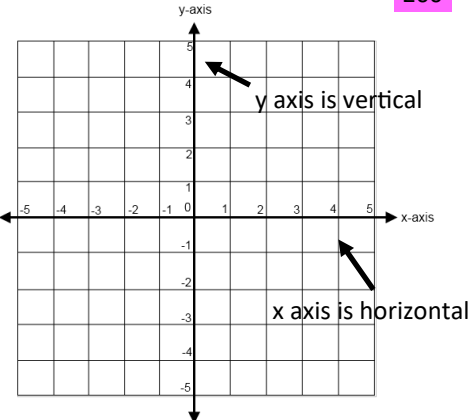


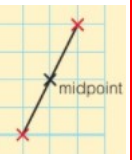
Lines 1- 4 are horizontal. They intersect with the y axis and all begin $y = \dots$

Lines 5-7 are vertical. They intersect with the x axis and all have equation $x = \dots$

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2) Coordinate axes 200



Line segment	The part of a line that connects two points.
Midpoint	The point exactly in the middle. 
Finding the midpoint	$\left(\frac{x_1 + x_2}{2}\right), \left(\frac{y_1 + y_2}{2}\right)$