

List of Facts and Formulae to Memorise: Foundation Tier

This document lists the facts and formulae that will not be provided in your maths GCSE exam. Keep testing yourself until you get them right every time. This is not a full revision list – it only covers facts and does not list all the skills and procedures you also need to know.

Number Facts

- First fifteen square numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225
- First five cube numbers: 1, 8, 27, 64, 125
- Powers of 2: 2, 4, 8, 16, 32, 64, 128, ...
- Powers of 3: 3, 9, 27, 81, ...
- Powers of 4: 4, 16, 64, ...
- Powers of 5: 5, 25, 125, 625, ...
- Powers of 10: 10, 100, 1000, 10000, ...
- The triangular numbers: 1, 3, 6, 10, 15, 21, 28, ...
- The Fibonacci sequence: 1, 1, 2, 3, 5, 8, 13, 21, ...
- Primes: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...

Index Laws

$$a^m \times a^n = a^{m+n}$$

$$a^{-m} = \frac{1}{a^m}$$

$$a^m \div a^n = a^{m-n}$$

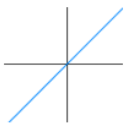
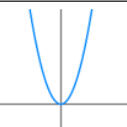
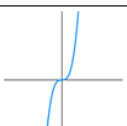
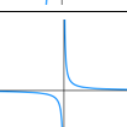
$$(a^m)^n = a^{m \times n} = a^{mn}$$

$$a^0 = 1$$

Types of Sequence

- Arithmetic: add the same amount each time
- Geometric: multiply by the same amount each time
- Quadratic: common second difference
- Fibonacci: add the previous two terms

Standard Graph Shapes

	LINEAR	$y = mx + c$
	QUADRATIC	$y = x^2$
	CUBIC	$y = x^3$
	RECIPROCAL	$y = \frac{1}{x}$

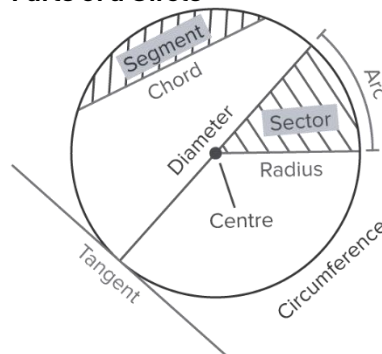
Exact Trig Values

	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	X

Metric Unit Conversions

- Length: 10mm in 1cm, 100cm in 1m, 1000m in 1km
- Mass: 1000mg in 1g, 1000g in 1kg, 1000kg in 1 tonne
- Capacity 1000ml in 1l, 100cl in 1l

Parts of a Circle



Area

- Area of rectangle, square and parallelogram = base x perpendicular height
- Area of triangle = $\frac{1}{2}$ x base x perpendicular height

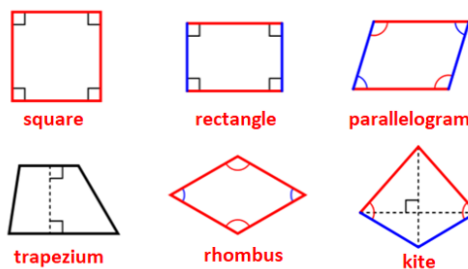
Sectors and Arcs

- Area of sector (radius r, angle x): $\frac{x}{360} \pi r^2$
- Length of arc (diameter d, angle x): $\frac{x}{360} \pi d$





Types of Angle

- Acute: Between 0° and 90°
- Right: 90°
- Obtuse: Between 90° and 180°
- Reflex: Between 180° and 360°

Quadrilaterals



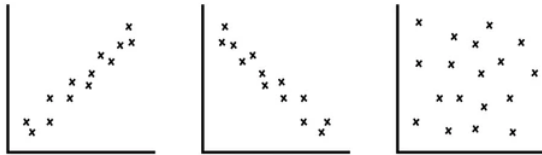
Triangles

Type of Triangle	Angle property	Diagram
Isosceles	The two base angles are equal	
Right angle	One angle is equal to 90°	
Equilateral	All three angles are equal to 60°	
Scalene	Three different angles (with no angle equal to 90°)	

Averages and Spread

- Mode = most frequent value
- Median = middle value (when ordered)
- Mean = sum the values and divide by how many there are
[from a grouped frequency table, estimate the mean using the midpoint of each class]
- Range = maximum value minus minimum value

Scatter Graphs



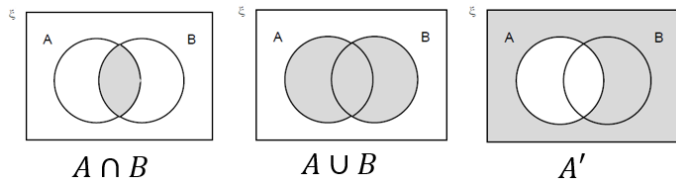
Positive Correlation

Negative Correlation

No Correlation

- Interpolation: making a prediction within the range of the data [using a line of best fit]
- Extrapolation: making a prediction outside the range of the data [unreliable]

Sets Notation



Linear Graphs

$$y = mx + c$$

↑ gradient ↑ y-intercept

- $m = \frac{\text{change in } y}{\text{change in } x}$
- Parallel lines have the same gradient
- $y = c$ is a horizontal line
- $x = a$ is a vertical line

Compound Measures

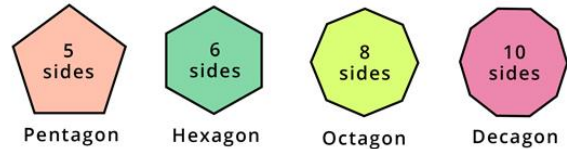
Speed = Distance ÷ Time

Density = Mass ÷ Volume

Fractions, Decimals and Percentages

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

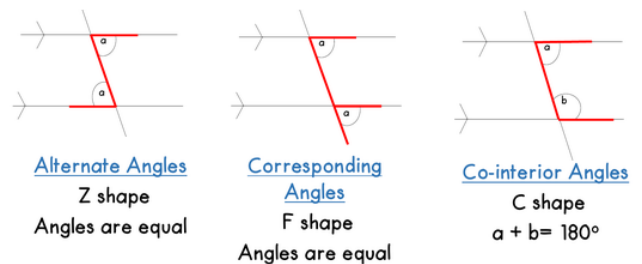
Polygon Names



Angle Facts

- Angles around a point sum to 360°
- Adjacent angles on a straight line sum to 180°
- Vertically opposite angles are equal
- Interior angles in a triangle sum to 180°
- Interior angles in a quadrilateral sum to 360°
- Opposite angles in parallelograms are equal

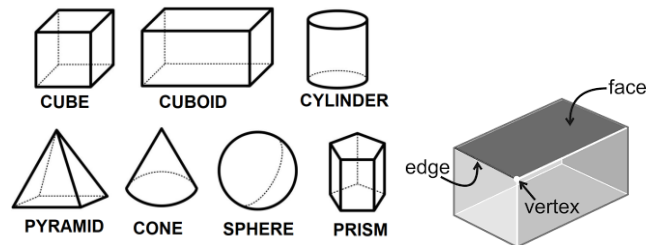
Angle in Parallel Lines



Angles in Polygons

- Sum of the interior angles of an n -sided polygon is $180(n - 2)$
- Sum of the exterior angles of any polygon is 360°
- interior angle + exterior angle = 180°

3D Shapes



Describing Shape Transformations

Reflection: Line of reflection

Rotation: Centre, angle and direction

Translation: Vector

Enlargement: Centre and scale factor

Bearings

Measure from the north, measure clockwise and give three figures

Plans and Elevations

