STUDY FORMULA BOOKLET

AQA GCSE Maths 8300 Foundation formulae sheet

The Foundation sheet prints trapezium, prism and circle formulae, Pythagoras, sine, cosine and tangent ratios, compound interest and one probability rule. Learn everything else.

IN THE BOOKLET printed in the official booklet LEARN IT not printed: students must recall it

Based on the official **GCSE Mathematics Foundation Tier Formulae Sheet (8300), AQA insert IB/M/Insert to GCSE Mathematics Foundation Tier/E5, for exams in 2024 only**, with what to learn and exam tips added by CuratedPrep.

Perimeter, area and volume

Printed on the sheet for the Foundation paper.

Area of a trapezium a and b are the lengths of the parallel sides; h is their perpendicular separation.	$A = \frac{1}{2}(a+b)h$	IN THE BOOKLET
Volume of a prism Works for cuboids and cylinders: a cylinder is V = πr²h.	$V = \text{area of cross section} \times \text{length}$	IN THE BOOKLET
Circumference of a circle r is the radius and d is the diameter.	$C = 2\pi r = \pi d$	IN THE BOOKLET
Area of a circle r is the radius. Leave answers in terms of π when asked.	$A = \pi r^2$	IN THE BOOKLET

Pythagoras' theorem and trigonometry

Pythagoras' theorem Right-angled triangle; c is the hypotenuse, the longest side.	$a^2 + b^2 = c^2$	IN THE BOOKLET
Sine ratio Opposite over hypotenuse (a is opposite A). In right-angled triangle ABC, c is the hypotenuse.	$\sin A = \frac{a}{c}$	IN THE BOOKLET
Cosine ratio Adjacent over hypotenuse (b is next to A).	$\cos A = \frac{b}{c}$	IN THE BOOKLET
Tangent ratio Opposite over adjacent.	$\tan A = \frac{a}{b}$	IN THE BOOKLET

Compound interest

Total accrued P is the principal amount, r is the interest rate over a given period (as a percentage) and n is the number of times the interest is compounded.	$\text{Total accrued} = P\left(1 + \frac{r}{100}\right)^n$	IN THE BOOKLET

Probability

Addition rule P(A) is the probability of outcome A and P(B) of outcome B. For mutually exclusive events the last term is zero.	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$	IN THE BOOKLET

Learn these: not in the booklet

Area of a triangle

$$A = \frac{1}{2}bh$$

Area of a parallelogram

$$A = bh$$

Volume of a cuboid

$$V = lwh;\ \text{cylinder: } V = \pi r^2 h$$

Arc length

$$l = \frac{\theta}{360} \times 2\pi r$$

Area of a sector

$$A = \frac{\theta}{360} \times \pi r^2$$

SOH CAH TOA

$$\sin\theta = \frac{O}{H},\ \cos\theta = \frac{A}{H},\ \tan\theta = \frac{O}{A};\ \text{angle} = \sin^{-1}\left(\frac{O}{H}\right)$$

Exact trig values

$$\sin 30^\circ = \tfrac{1}{2},\ \cos 60^\circ = \tfrac{1}{2},\ \sin 45^\circ = \cos 45^\circ = \tfrac{\sqrt{2}}{2},\ \sin 60^\circ = \cos 30^\circ = \tfrac{\sqrt{3}}{2},\ \sin 0^\circ = \cos 90^\circ = 0,\ \sin 90^\circ = \cos 0^\circ = 1$$

Exact tan values

$$\tan 0^\circ = 0,\ \tan 30^\circ = \tfrac{\sqrt{3}}{3},\ \tan 45^\circ = 1,\ \tan 60^\circ = \sqrt{3}$$

Speed, density, pressure

$$\text{speed} = \frac{\text{distance}}{\text{time}},\ \text{density} = \frac{\text{mass}}{\text{volume}},\ \text{pressure} = \frac{\text{force}}{\text{area}}$$

Metric conversions

$$1\text{ m} = 100\text{ cm},\ 1\text{ cm}^2 = 100\text{ mm}^2,\ 1\text{ m}^2 = 10\,000\text{ cm}^2,\ 1\text{ m}^3 = 1\,000\,000\text{ cm}^3,\ 1\text{ litre} = 1000\text{ cm}^3$$

Simple interest

$$I = \frac{Prt}{100}$$

Percentage change

$$\frac{\text{new} - \text{old}}{\text{old}} \times 100$$

Percentage multipliers

$$\text{increase by } r\%\text{: } \times \left(1 + \frac{r}{100}\right);\ \text{decrease by } r\%\text{: } \times \left(1 - \frac{r}{100}\right)$$

Original value (reverse percentage)

$$\text{original} = \frac{\text{new value}}{\text{multiplier}}$$

Sharing in a ratio

$$\text{one part} = \frac{\text{total}}{\text{total number of parts}}$$

Mean from a frequency table

$$\bar{x} = \frac{\sum fx}{\sum f},\quad \text{range} = \text{largest} - \text{smallest}$$

Estimated mean from grouped data

$$\bar{x} \approx \frac{\sum f \times \text{midpoint}}{\sum f}$$

Probability basics

$$P(\text{not } A) = 1 - P(A),\ \text{all outcomes sum to 1},\ \text{expected number} = P \times n$$

Relative frequency

$$\frac{\text{number of times the outcome happens}}{\text{total number of trials}}$$

Independent events

$$P(A \text{ and } B) = P(A) \times P(B)$$

Angle sums

$$\text{triangle } 180^\circ,\ \text{quadrilateral } 360^\circ,\ \text{straight line } 180^\circ,\ \text{point } 360^\circ$$

Polygons

$$\text{interior angle sum} = (n-2) \times 180^\circ,\quad \text{exterior angle of a regular polygon} = \frac{360^\circ}{n},\quad \text{interior} = 180^\circ - \text{exterior}$$

Straight line

$$y = mx + c,\ m = \frac{\text{change in } y}{\text{change in } x},\ \text{parallel lines have equal } m$$

nth term of a linear sequence

$$an + b,\ \text{where } a \text{ is the common difference}$$

Direct and inverse proportion

$$y = kx,\quad y = \frac{k}{x}$$

Index laws

$$a^m \times a^n = a^{m+n},\ a^m \div a^n = a^{m-n},\ (a^m)^n = a^{mn},\ a^0 = 1,\ a^{-n} = \frac{1}{a^n}$$

Expanding two brackets

$$(x+p)(x+q) = x^2 + (p+q)x + pq$$

Difference of two squares

$$a^2 - b^2 = (a-b)(a+b)$$

Similar shapes

$$\text{scale factor } k = \frac{\text{new length}}{\text{original length}}$$

Bearings

$$\text{measured clockwise from north in three figures; back bearing} = \text{bearing} \pm 180^\circ$$

Standard form

$$A \times 10^n,\ 1 \le A < 10,\ n \text{ an integer}$$

Error interval after rounding

$$\text{lower bound} \le x < \text{upper bound},\ \text{half the rounding unit either side}$$

Column vectors

$$\begin{pmatrix} a \\ b \end{pmatrix} + \begin{pmatrix} c \\ d \end{pmatrix} = \begin{pmatrix} a+c \\ b+d \end{pmatrix},\quad k\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} ka \\ kb \end{pmatrix}$$

Using the booklet in the exam

- Open the insert at the start of the paper and note what is printed, so you do not waste time recalling it.
- Label the triangle with opposite, adjacent and hypotenuse before using the sheet's a, b and c ratios.
- Check which side is c: it is always the hypotenuse, opposite the right angle, and the sheet's ratios assume that labelling.
- For compound interest, make n match the compounding period: 3 years of yearly interest is n = 3.
- The sheet gives the addition rule only. Multiplying probabilities for independent events (tree diagrams) is not printed, so learn it.

Based on: AQA GCSE Mathematics 8300 (Foundation tier), Formulae Sheet insert, exams in 2024; AQA GCSE Mathematics 8300 specification, Appendix: mathematical formulae. Statistical tables are calculated by CuratedPrep to the same layout. Updated 31 October 2026. Always practise with the version of the official booklet your exam uses. More free sheets and topic worksheets at curatedprep.com.