FORMULA SHEET

GCSE and IGCSE maths formula sheet

The AQA sheet prints trapezium, prism and circle formulae, Pythagoras, basic trigonometry and compound interest; Higher adds the quadratic formula, sine and cosine rules. Learn everything else.

IN THE BOOKLET printed in the official booklet or sheet in the exam LEARN IT students must recall it

Area, perimeter and volume (AQA 8300)

Four of these are printed on the sheet at both tiers; the rest you must recall.

Area of a trapezium a and b are the parallel sides, h is their perpendicular separation.	$A = \frac{1}{2}(a+b)h$	IN THE BOOKLET
Volume of a prism Use it 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 Leave answers in terms of π when asked.	$A = \pi r^2$	IN THE BOOKLET
Area of a triangle b is the base and h the perpendicular height. Not printed.	$A = \frac{1}{2}bh$	LEARN IT
Area of a parallelogram Perpendicular height, not the slant side.	$A = bh$	LEARN IT
Arc length Fraction of the circumference; θ is the sector angle in degrees.	$l = \frac{\theta}{360} \times 2\pi r$	LEARN IT
Area of a sector Fraction of the full circle area.	$A = \frac{\theta}{360} \times \pi r^2$	LEARN IT

Given in the question, not on the sheet (AQA 8300)

AQA's specification says these are given in the relevant question when needed, so look for them in the question stem.

Curved surface area of a cone l is the slant height. Given in the question per the AQA specification.	$A = \pi r l$	SEE NOTE
Surface area of a sphere Given in the question per the AQA specification.	$A = 4\pi r^2$	SEE NOTE
Volume of a sphere Given in the question per the AQA specification.	$V = \frac{4}{3}\pi r^3$	SEE NOTE
Volume of a cone h is the perpendicular height. Given in the question per the AQA specification.	$V = \frac{1}{3}\pi r^2 h$	SEE NOTE
Constant acceleration: velocity u initial velocity, v final velocity, a acceleration, t time. Given in the question.	$v = u + at$	SEE NOTE

Constant acceleration: displacement s is displacement from the position at t = 0. Given in the question.	$s = ut + \frac{1}{2}at^2$	SEE NOTE
Constant acceleration: velocity and displacement Given in the question.	$v^2 = u^2 + 2as$	SEE NOTE

Pythagoras and trigonometry (AQA 8300)

Pythagoras' theorem c is the hypotenuse of a right-angled triangle.	$a^2 + b^2 = c^2$	IN THE BOOKLET
Sine ratio Opposite over hypotenuse, with a opposite angle A.	$\sin A = \frac{a}{c}$	IN THE BOOKLET
Cosine ratio Adjacent over hypotenuse.	$\cos A = \frac{b}{c}$	IN THE BOOKLET
Tangent ratio Opposite over adjacent.	$\tan A = \frac{a}{b}$	IN THE BOOKLET
Sine rule Higher only. Use it with a matching side and angle pair.	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	IN THE BOOKLET
Cosine rule Higher only. Use it for two sides and the included angle, or all three sides.	$a^2 = b^2 + c^2 - 2bc\cos A$	IN THE BOOKLET
Area of any triangle Higher only. C is the angle between sides a and b.	$A = \frac{1}{2}ab\sin C$	IN THE BOOKLET
Exact values of sine Both tiers (Additional foundation content). Not printed.	$\sin 0^\circ = 0,\ \sin 30^\circ = \frac{1}{2},\ \sin 45^\circ = \frac{\sqrt{2}}{2},\ \sin 60^\circ = \frac{\sqrt{3}}{2},\ \sin 90^\circ = 1$	LEARN IT
Exact values of cosine Cosine runs backwards through the sine values.	$\cos 0^\circ = 1,\ \cos 30^\circ = \frac{\sqrt{3}}{2},\ \cos 45^\circ = \frac{\sqrt{2}}{2},\ \cos 60^\circ = \frac{1}{2},\ \cos 90^\circ = 0$	LEARN IT
Exact values of tangent tan 90 is undefined. tan 30 can also be written 1 over root 3.	$\tan 0^\circ = 0,\ \tan 30^\circ = \frac{\sqrt{3}}{3},\ \tan 45^\circ = 1,\ \tan 60^\circ = \sqrt{3}$	LEARN IT

Algebra and graphs (AQA 8300)

Quadratic formula Higher only, for ax² + bx + c = 0 with a not zero. It is not on the Foundation sheet.	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	IN THE BOOKLET
Difference of two squares Used in factorising and in rationalising denominators.	$a^2 - b^2 = (a - b)(a + b)$	LEARN IT
Completed square form Turning point is at x = -b/2. Higher uses it to find turning points.	$x^2 + bx + c = \left(x + \frac{b}{2}\right)^2 + c - \frac{b^2}{4}$	LEARN IT
nth term of a linear sequence a is the first term and d the common difference.	$u_n = a + (n - 1)d$	LEARN IT
Equation of a straight line m is the gradient and c the y-intercept.	$y = mx + c$	LEARN IT

Gradient between two points Parallel lines have equal gradients.	$m = \frac{y_2 - y_1}{x_2 - x_1}$	LEARN IT
Perpendicular gradients Higher only. Negative reciprocal gradients.	$m_1 \times m_2 = -1$	LEARN IT
Circle centred on the origin Higher only. r is the radius.	$x^2 + y^2 = r^2$	LEARN IT

Percentages, rates and proportion (AQA 8300)

Compound interest P is the principal, r the percentage rate per period and n the number of periods.	$\text{Total accrued} = P\left(1 + \frac{r}{100}\right)^n$	IN THE BOOKLET
Simple interest Same symbols as above, with t in years and r the yearly rate.	$I = \frac{Prt}{100}$	LEARN IT
Percentage change Also written as change over original, times 100.	$\text{percentage change} = \frac{\text{new} - \text{old}}{\text{old}} \times 100$	LEARN IT
Original value (reverse percentage) For example, after a 20% rise the multiplier is 1.2.	$\text{original} = \frac{\text{new value}}{\text{multiplier}}$	LEARN IT
Speed Rearrange for distance or time; check units such as m/s or km/h.	$\text{speed} = \frac{\text{distance}}{\text{time}}$	LEARN IT
Density Typically g/cm³ or kg/m³.	$\text{density} = \frac{\text{mass}}{\text{volume}}$	LEARN IT
Pressure Newtons per square metre gives pascals.	$\text{pressure} = \frac{\text{force}}{\text{area}}$	LEARN IT
Scale factors in similar shapes Higher only. k is the length scale factor.	$\text{area scale factor} = k^2, \quad \text{volume scale factor} = k^3$	LEARN IT

Angles, probability and statistics (AQA 8300)

Addition rule Both tiers. 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
Conditional probability Higher only.	$P(A \text{ and } B) = P(A \text{ given } B)\,P(B)$	IN THE BOOKLET
Probability of an event not happening All probabilities of an exhaustive set add to 1.	$P(\text{not } A) = 1 - P(A)$	LEARN IT
Independent events Used for tree diagrams. Not printed by AQA.	$P(A \text{ and } B) = P(A) \times P(B)$	LEARN IT
Expected frequency Relative frequency is frequency divided by total frequency.	$\text{expected number} = P(\text{event}) \times \text{number of trials}$	LEARN IT
Mean from a frequency table Multiply each value by its frequency before adding.	$\bar{x} = \frac{\sum fx}{\sum f}$	LEARN IT

Sum of interior angles of a polygon n is the number of sides.	$S = (n-2) \times 180^\circ$	LEARN IT
Exterior angle of a regular polygon Interior angle = 180 minus exterior angle.	$\text{exterior angle} = \dfrac{360^\circ}{n}$	LEARN IT

Pearson Edexcel GCSE 1MA1

The 2025 Exam Aid prints the same formulae as AQA at each tier, so the Given labels above also hold for Edexcel.

Foundation Exam Aid prints Edexcel Foundation. There is no quadratic formula or sine and cosine rule on this sheet.	$\frac{1}{2}(a+b)h,\ \pi r^2,\ 2\pi r,\ a^2+b^2=c^2,\ \sin A = \frac{a}{c},\ P\left(1+\frac{r}{100}\right)^n,\ P(A \text{ or } B)$	IN THE BOOKLET
Higher Exam Aid adds Edexcel Higher. Matches the AQA Higher sheet, so the same learn list applies.	$x = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a},\ \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C},\ a^2 = b^2 + c^2 - 2bc\cos A,\ \frac{1}{2}ab\sin C,\ P(A \text{ and } B) = P(A \text{ given } B)P(B)$	IN THE BOOKLET

OxfordAQA International GCSE 9260

OxfordAQA is a different board from AQA. Its Core and Extension sheets are shorter than AQA's.

Core sheet prints OxfordAQA Core. No compound interest, quadratic formula or sine and cosine rules.	$\frac{1}{2}(a+b)h,\ V = \text{area} \times \text{length},\ 2\pi r,\ \pi r^2,\ a^2+b^2 = c^2,\ \sin x = \frac{a}{c}$	IN THE BOOKLET
Mutually exclusive events Printed on both OxfordAQA sheets. AQA prints the general addition rule instead.	$P(A \cup B) = P(A) + P(B)$	LEARN IT
Extension sheet adds OxfordAQA Extension. Same as the AQA Higher sheet.	$x = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a},\ \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C},\ a^2 = b^2 + c^2 - 2bc\cos A,\ \frac{1}{2}ab\sin C$	IN THE BOOKLET
Independent events Printed on the OxfordAQA Extension sheet only; AQA does not print it.	$P(A \cap B) = P(A) \times P(B)$	LEARN IT
Compound interest (Extension) OxfordAQA Extension: n is the number of years.	$\text{Value of investment} = P\left(1+\dfrac{r}{100}\right)^n$	IN THE BOOKLET

Cambridge IGCSE Mathematics 0580

Cambridge prints a List of formulas on page 2 of every paper (Core: Papers 1 and 3; Extended: Papers 2 and 4), and a different mix from AQA.

Cylinder: curved surface area Printed by Cambridge on both lists. AQA does not print it.	$A = 2\pi rh$	LEARN IT
Cylinder: volume Printed by Cambridge; for AQA it comes from the prism formula.	$V = \pi r^2 h$	LEARN IT
Cone: curved surface area and volume Printed by Cambridge. AQA gives these in the question.	$A = \pi rl, \quad V = \frac{1}{3}\pi r^2 h$	SEE NOTE
Sphere: surface area and volume Printed by Cambridge. AQA gives these in the question.	$A = 4\pi r^2, \quad V = \frac{4}{3}\pi r^3$	SEE NOTE

Pyramid: volume A is the base area, h the height. Printed by Cambridge; AQA does not list it.	$V = \frac{1}{3}Ah$	SEE NOTE
Area of a triangle Printed by Cambridge on both lists. AQA does not print it.	$A = \frac{1}{2}bh$	LEARN IT
Extended list also prints Extended Papers 2 and 4 only; the Core list does not include these.	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$, $a^2 = b^2 + c^2 - 2bc\cos A$, $\frac{1}{2}ab\sin C$	IN THE BOOKLET
Cambridge does not print: Pythagoras and trigonometry AQA prints these; for 0580 you must recall them.	$a^2 + b^2 = c^2$, $\sin A = \frac{\text{opp}}{\text{hyp}}$	IN THE BOOKLET
Cambridge does not print: trapezium area AQA prints it; the 0580 syllabus says formulas other than triangle area are not given.	$A = \frac{1}{2}(a + b)h$	IN THE BOOKLET
Cambridge does not print: compound interest AQA prints it; the 0580 syllabus says interest formulas are not given, so memorise it.	$P\left(1 + \frac{r}{100}\right)^n$	IN THE BOOKLET
Speed The 0580 syllabus says knowledge of this formula is required. Formulas for density and pressure are given in the question.	$\text{speed} = \frac{\text{distance}}{\text{time}}$	LEARN IT

Cambridge Additional Mathematics 0606

0606 has its own List of formulas, which goes beyond any GCSE sheet above; it is not the 0580 list.

Equation of a circle Centre (a, b), radius r. Printed on the 0606 list; AQA GCSE only needs the origin case.	$(x - a)^2 + (y - b)^2 = r^2$	SEE NOTE
Binomial theorem Printed on the 0606 list; not part of GCSE 8300.	$(a + b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \cdots + b^n$	SEE NOTE
Sum to infinity of a geometric series Printed on the 0606 list; not part of GCSE 8300.	$S_\infty = \frac{a}{1 - r}, \quad \lvert r\rvert < 1$	SEE NOTE

Learn these: not in the booklet

Area of a triangle

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

Not printed by AQA, Edexcel or OxfordAQA.

Area of a parallelogram

$A = bh$

Arc length and sector area

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

Exact trigonometric values

$\sin 30° = \frac{1}{2}$, $\cos 60° = \frac{1}{2}$, $\sin 45° = \cos 45° = \frac{\sqrt{2}}{2}$, $\tan 60° = \sqrt{3}$

Speed, density, pressure

$\text{speed} = \frac{d}{t}$, $\text{density} = \frac{m}{V}$, $\text{pressure} = \frac{F}{A}$

Simple interest

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

Percentage change

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

Independent events

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

Mean from a frequency table

$$\bar{x} = \frac{\sum fx}{\sum f}$$

Interior angle sum of a polygon

$$(n - 2) \times 180^\circ$$

Straight line

$$y = mx + c, \quad m_1 m_2 = -1$$

The perpendicular gradient rule is Higher tier.

Difference of two squares

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

Similar shapes (Higher)

$$\text{area scale factor } k^2, \quad \text{volume scale factor } k^3$$

Using the sheet in the exam

- Open the sheet on the first page of the paper and note which formulas are printed, so you stop trying to recall them.
- Check your tier: the Foundation sheet has no quadratic formula, sine rule, cosine rule or conditional probability.
- Read each question stem for cone, sphere or acceleration formulas; AQA gives these in the question, not on the sheet.
- Label your triangle with opposite, adjacent and hypotenuse before using the sheet's a, b, c ratios.
- For compound interest, make n match the compounding period: 3 years of yearly interest means n = 3, but monthly means n = 36.

Checked against the official documents: AQA GCSE Mathematics 8300 (Foundation and Higher), Formulae Sheet insert, exams in 2026; AQA GCSE Mathematics 8300 specification, Appendix: mathematical formulae; Pearson Edexcel GCSE (9-1) Mathematics 1MA1, Higher tier Exam Aid, 2025; OxfordAQA International GCSE Mathematics 9260, Formulae Sheet, Extension; Cambridge IGCSE Mathematics 0580, Syllabus for 2025, 2026 and 2027 (List of formulas); Cambridge IGCSE Additional Mathematics 0606, Syllabus for 2025, 2026 and 2027 (List of formulas). Updated 31 October 2026. Boards update their booklets from time to time: always practise with the version your exam uses. More free sheets and topic worksheets at curatedprep.com.