

GCSE Maths formula sheet

Foundation and Higher: what is on the exam sheet and what to learn · Checked 21 October 2026

An original MathsDaily revision sheet, not the official exam sheet. In GCSE Maths exams in England, every board (AQA, Pearson Edexcel and OCR) provides a formulae sheet: 8 formulae on Foundation, and the same 8 plus 5 more on Higher. Each formula below is labelled to show whether it is on that sheet, given in the question, or one you must learn.

On the sheet: Printed on the formulae sheet for both Foundation and Higher.

Higher sheet only: Printed on the Higher tier sheet only. Higher students can look it up; Foundation students do not need it.

Given in the question: Not on the sheet, but printed in the question whenever you need it.

Learn: not given: Not on the sheet and not given in questions. You must know it.

Area, volume and circles

Area of a trapezium

On the sheet

$$\text{Area} = \frac{1}{2}(a + b)h$$

a and b are the parallel sides; h is the perpendicular height between them.

Volume of a prism

On the sheet

$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

Works for any prism, including a cylinder (cross-section πr^2).

Circumference and area of a circle

On the sheet

$$C = 2\pi r = \pi d; A = \pi r^2$$

Use the π button unless the question says to use 3.14 or to leave the answer in terms of π .

Rectangle, triangle and parallelogram

LEARN: NOT GIVEN

$$\text{Rectangle: } A = lw; \text{ triangle: } A = \frac{1}{2}bh; \text{ parallelogram: } A = bh$$

h is always the perpendicular height, not the slanted side.

Cuboid and cylinder

LEARN: NOT GIVEN

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

Arc length and sector area

LEARN: NOT GIVEN

$$\text{Arc length} = \left(\frac{\theta}{360}\right) \times 2\pi r; \text{ sector area} = \left(\frac{\theta}{360}\right) \times \pi r^2$$

θ is the angle at the centre, in degrees.

Volume of a pyramid

LEARN: NOT GIVEN

$$V = \frac{1}{3} \times \text{area of base} \times \text{perpendicular height}$$

Spheres and cones

Given in the question

$$\text{Sphere: } V = \frac{4}{3}\pi r^3, \text{ surface area} = 4\pi r^2$$

$$\text{Cone: } V = \frac{1}{3}\pi r^2 h, \text{ curved surface area} = \pi r l$$

l is the slant height. These are given in the question when you need them.

Pythagoras and trigonometry

Pythagoras' theorem

On the sheet

$$a^2 + b^2 = c^2$$

Right-angled triangles only; c is the hypotenuse, opposite the right angle.

Trigonometric ratios (SOHCAHTOA)

On the sheet

$$\sin A = \text{opp/hyp}; \cos A = \text{adj/hyp}; \tan A = \text{opp/adj}$$

Right-angled triangles only. Check your calculator is in degrees.

Exact trigonometric values

LEARN: NOT GIVEN

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

$$\sin 0^\circ = 0, \cos 0^\circ = 1, \tan 0^\circ = 0; \sin 90^\circ = 1, \cos 90^\circ = 0$$

Needed for non-calculator papers on both tiers.

Sine rule

Higher sheet only

$$a/\sin A = b/\sin B = c/\sin C$$

Higher tier. Side a is opposite angle A.

Cosine rule

Higher sheet only

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Higher tier. Use it when you know two sides and the angle between them, or all three sides.

Area of any triangle

Higher sheet only

$$\text{Area} = \frac{1}{2}ab \sin C$$

Higher tier. C is the angle between sides a and b.

Number, money and compound measures

Compound interest

On the sheet

$$\text{Total accrued} = P(1 + r/100)^n$$

P is the amount invested, r the percentage rate per period, n the number of periods. For depreciation, learn the version $P(1 - r/100)^n$.

Simple interest

LEARN: NOT GIVEN

$$\text{Interest} = P \times r \times t / 100$$

r is the yearly percentage rate and t the number of years.

Percentage change

LEARN: NOT GIVEN

$$\text{Percentage change} = (\text{change} \div \text{original}) \times 100$$

Always divide by the original value, not the new one.

Speed, density and pressure

LEARN: NOT GIVEN

$$\text{Speed} = \text{distance} \div \text{time}; \text{density} = \text{mass} \div \text{volume}; \text{pressure} = \text{force} \div \text{area}$$

Check the units match before you calculate.

Laws of indices**LEARN: NOT GIVEN**

$a^m \times a^n = a^{m+n}$; $a^m \div a^n = a^{m-n}$; $(a^m)^n = a^{mn}$; $a^0 = 1$
Higher: $a^{-n} = 1/a^n$; $a^{1/n} = \sqrt[n]{a}$

Direct and inverse proportion**LEARN: NOT GIVEN**

$y \propto x$: $y = kx$; $y \propto 1/x$: $y = k/x$

Find k from one known pair of values first. Inverse proportion equations are Higher tier.

Kinematics**Given in the question**

$v = u + at$; $v^2 = u^2 + 2as$; $s = ut + \frac{1}{2}at^2$

Higher tier. Given in the question when you need them.

Algebra and graphs

Quadratic formula**Higher sheet only**

$ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Higher tier. Rearrange to $= 0$ before reading off a, b and c.

Straight-line graphs**LEARN: NOT GIVEN**

$y = mx + c$; gradient $m = \text{change in } y \div \text{change in } x$

c is the y-intercept. Parallel lines have equal gradients.

Perpendicular gradients**LEARN: NOT GIVEN**

$m_1 \times m_2 = -1$

Higher tier. The perpendicular gradient is the negative reciprocal.

Equation of a circle**LEARN: NOT GIVEN**

$x^2 + y^2 = r^2$

Higher tier. Centre at the origin, radius r.

Difference of two squares**LEARN: NOT GIVEN**

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

Geometry

Angle facts**LEARN: NOT GIVEN**

Angles on a straight line = 180° ; around a point = 360° ; triangle = 180° ; quadrilateral = 360°

Vertically opposite angles are equal. Alternate and corresponding angles on parallel lines are equal.

Polygons**LEARN: NOT GIVEN**

Sum of interior angles = $(n - 2) \times 180^\circ$; sum of exterior angles = 360°

For a regular polygon, each exterior angle = $360^\circ \div n$.

Similar shapes**LEARN: NOT GIVEN**

Length scale factor $k \Rightarrow$ area scale factor k^2 , volume scale factor k^3

Area and volume scale factors are Higher tier.

Probability and statistics**Probability: either event****On the sheet**

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

If A and B cannot both happen, $P(A \text{ and } B) = 0$, so $P(A \text{ or } B) = P(A) + P(B)$.

Probability: both events**Higher sheet only**

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

Higher tier. For independent events, $P(A \text{ and } B) = P(A) \times P(B)$.

Probability facts**LEARN: NOT GIVEN**

$P(\text{not } A) = 1 - P(A)$; probabilities of all outcomes add up to 1; expected frequency = probability $\times$ number of trials

Averages and range**LEARN: NOT GIVEN**

Mean = total $\div$ number of values; median = middle value in order; mode = most common; range = largest – smallest

$$\text{Mean from a frequency table} = \Sigma fx \div \Sigma f$$

See the mean, median, mode and range guide.

Spread and histograms**LEARN: NOT GIVEN**

Interquartile range = upper quartile – lower quartile; frequency density = frequency $\div$ class width

Higher tier.

Checklist: formulae to learn

None of these is on the exam formulae sheet. Tick each one when you can write it from memory.

Area, volume and circles

- ☐ Rectangle, triangle and parallelogram
- ☐ Cuboid and cylinder
- ☐ Arc length and sector area
- ☐ Volume of a pyramid

Pythagoras and trigonometry

- ☐ Exact trigonometric values

Number, money and compound measures

- ☐ Simple interest
- ☐ Percentage change
- ☐ Speed, density and pressure
- ☐ Laws of indices
- ☐ Direct and inverse proportion

Algebra and graphs

- ☐ Straight-line graphs
- ☐ Perpendicular gradients
- ☐ Equation of a circle
- ☐ Difference of two squares

Geometry

- ☐ Angle facts
- ☐ Polygons
- ☐ Similar shapes

Probability and statistics

- ☐ Probability facts
- ☐ Averages and range
- ☐ Spread and histograms

Official sources

Ofqual: [decisions on changes to the assessment of GCSE maths, physics and combined science in 2025, 2026 and 2027](#)

AQA: [GCSE Maths and Sciences formulae and equation sheets for 2027 and 2028 onwards](#)

AQA: [GCSE Maths and Sciences formulae and equation sheets for 2026–2027](#)

AQA GCSE Mathematics (8300) specification: [mathematical formulae](#)

Department for Education: [GCSE mathematics subject content and assessment objectives](#)

Always revise from the sheet your exam board publishes for your exam series.