

What the Exam Does Not Give You

Edexcel International GCSE Mathematics — Higher Tier

ON THE FORMULA SHEET

✓ YOU ARE GIVEN THESE

Every formula printed on the exam formulae sheet. You are not asked to memorise them — but you do need to know when to use each one, and how to rearrange it.

Arithmetic series: sum to n terms (a = first term, d = difference)

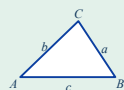
$$S_n = \frac{n}{2} [2a + (n-1)d]$$

Quadratic formula ($ax^2 + bx + c = 0$)

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine rule (any triangle ABC)

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



Cosine rule (for a side)

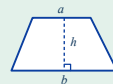
$$a^2 = b^2 + c^2 - 2bc \cos A$$

Area of a triangle (C is between a and b)

$$\frac{1}{2} ab \sin C$$

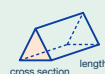
Area of a trapezium

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



Volume of a prism

area of cross section $\times$ length



Volume of a cylinder

$$\pi r^2 h$$



Curved SA of a cylinder

$$2\pi r h$$

Volume of a cone

$$\frac{1}{3} \pi r^2 h$$



Curved SA of a cone (l = slant)

$$\pi r l$$

Volume of a sphere

$$\frac{4}{3} \pi r^3$$



Surface area of a sphere (total)

$$4\pi r^2$$

That is the whole sheet — 13 formulae.
Note “curved”: for a *total* surface area you must add the circular base or ends yourself, and that is not given.

NOT ON THE FORMULA SHEET

✗ YOU MUST MEMORISE THESE

None of these are printed anywhere on the formulae sheet. This is what revision is actually for.

Shape & Trig

Pythagoras' theorem — c is the hypotenuse

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



SOHCAHTOA

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Cosine rule rearranged — finding an **angle**

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

Circle — area and circumference (r = radius)

$$A = \pi r^2 \quad C = 2\pi r$$



Arc length and sector area — θ in degrees

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

Area of a triangle — base and perpendicular height

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



Number & Algebra

Percentage change — bottom is the original

$$\frac{\text{change}}{\text{original}} \times 100$$

Compound interest — the **amount**, not the interest (P = start, r = rate, n = periods)

$$\text{amount} = P \left(1 + \frac{r}{100} \right)^n$$

Reverse percentage — multiplier = $1 \pm r/100$

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

Speed and density

$$\text{speed} = \frac{\text{distance}}{\text{time}} \quad \text{density} = \frac{\text{mass}}{\text{volume}}$$

Index laws

$$a^m \times a^n = a^{m+n} \quad a^{-n} = \frac{1}{a^n} \quad a^{m/n} = \sqrt[n]{a^m}$$

n th term of an **arithmetic** sequence

$$u_n = a + (n-1)d$$

Graphs & Stats

Equation of a straight line — m = gradient, c = y -intercept

$$y = mx + c$$



Gradient — perpendicular gradients multiply to -1

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Midpoint of a line segment

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Mean from a frequency table — grouped: x = class midpoint, answer is an **estimate**

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

Frequency density — on a histogram the **area** is the frequency

$$\frac{\text{frequency}}{\text{class width}}$$



Interquartile range

$$\text{IQR} = Q_3 - Q_1$$

Also not given: sum of interior angles $(n-2) \times 180^\circ$ • each exterior angle of a **regular** polygon $360^\circ/n$ • volume of a pyramid $\frac{1}{3} \times \text{base area} \times \text{height}$ • direct and inverse proportion $y = kx$, $y = k/x$ • length of a line segment $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

