IGCSE Maths Formulas

Cambridge 0580 and Edexcel 4MA1, by what is printed and what is not

Formulas the IGCSE papers print for you, by board and tier

Every formula that appears on either board's printed list. Anything not in this table is not given on the formula page.

Formula	Given in exam?	Notes
Area of triangle = $\frac{1}{2}bh$	Cambridge: Core and Extended. Edexcel: no	Edexcel candidates learn it
Area of circle = πr^2	Cambridge: Core and Extended. Edexcel: no	Edexcel candidates learn it
Circumference = $2\pi r$	Cambridge: Core and Extended. Edexcel: no	Edexcel candidates learn it
Area of trapezium = $\frac{1}{2}(a + b)h$	Edexcel: Foundation and Higher. Cambridge: no	Cambridge candidates learn it
Volume of prism = cross-section area × length	Yes, both boards, every tier	
Volume of cylinder = $\pi r^2 h$	Yes, both boards, every tier	
Curved surface area of cylinder = $2\pi rh$	Yes, both boards, every tier	
Volume of pyramid = $\frac{1}{3}$ × base area × height	Cambridge: Core and Extended. Edexcel: no	
Volume of cone = $\frac{1}{3}\pi r^2 h$	Cambridge: both tiers. Edexcel: Higher only	Edexcel Foundation: learn it or expect it in the question
Curved surface area of cone = πrl	Cambridge: both tiers. Edexcel: Higher only	l is the slant height
Volume of sphere = $\frac{4}{3}\pi r^3$	Cambridge: both tiers. Edexcel: Higher only	
Surface area of sphere = $4\pi r^2$	Cambridge: both tiers. Edexcel: Higher only	
Quadratic formula	Cambridge Extended and Edexcel Higher	Not needed at Core or Foundation
Sine rule and cosine rule	Cambridge Extended and Edexcel Higher	Cosine rule printed in the form for a side
Area of triangle = $\frac{1}{2}ab \sin C$	Cambridge Extended and Edexcel Higher	
Sum of an arithmetic series	Edexcel Higher only	Not on the Cambridge 0580 syllabus

Number and algebra formulas IGCSE students must memorise

None of these is printed on either board's formula page. The notes say which tiers need them.

Formula	Given in exam?	Notes
Percentage change = change ÷ original × 100	No	All tiers
Compound growth: $P(1 + r/100)^n$; depreciation uses $(1 - r/100)^n$	No	All tiers; Cambridge states interest formulas are not given
Reverse percentage: original = new amount ÷ multiplier	No	All tiers; after a 15% rise, divide by 1.15
Standard form $A \times 10^n$, $1 \le A < 10$	No	All tiers
Index laws, including $a^0 = 1$ and $a^{-n} = 1/a^n$	No	All tiers; fractional indices at Extended and Higher
Surds: $\sqrt{a} \times \sqrt{b} = \sqrt{(ab)}$	No	Cambridge Extended, Edexcel Higher
Bounds: half a unit either side of the rounded value	No	All tiers; bounds of calculations at Extended and Higher
Speed = distance ÷ time	No	All tiers; Cambridge expects it known
Density = mass ÷ volume; pressure = force ÷ area	Not on the list; usually in the question	Cambridge gives rate formulas other than speed in the question, and Edexcel does the same for pressure
Difference of two squares: $a^2 - b^2 = (a + b)(a - b)$	No	Used most at Extended and Higher
Completing the square: $x^2 + bx = (x + b/2)^2 - (b/2)^2$	No	Cambridge Extended, Edexcel Higher
nth term of a linear sequence: $dn + (a - d)$	No	All tiers
Proportion: $y = kx$, $y = k/x$, and squared or rooted forms	No	Algebraic form at Cambridge Extended and Edexcel Higher
Differentiation: $y = ax^n$ gives $dy/dx = nax^{n-1}$	No	Cambridge Extended, Edexcel Higher; turning points where $dy/dx = 0$

Geometry and trigonometry formulas not printed on IGCSE papers

This is where most “I didn't know that was on the sheet” moments happen.

Formula	Given in exam?	Notes
Pythagoras: $a^2 + b^2 = c^2$	No	All tiers, both boards
$\sin\theta$ = opp/hyp, $\cos\theta$ = adj/hyp, $\tan\theta$ = opp/adj	No	All tiers, both boards
Arc length = $\theta/360 \times 2\pi r$; sector area = $\theta/360 \times \pi r^2$	No	All tiers, both boards

Formula	Given in exam?	Notes
Gradient = change in y ÷ change in x; $y = mx + c$	No	All tiers
Midpoint = $((x_1 + x_2)/2, (y_1 + y_2)/2)$	No	Cambridge Extended; Edexcel from Foundation
Length of a line segment by Pythagoras on the coordinates	No	Cambridge Extended, Edexcel Higher
Perpendicular gradients multiply to −1	No	Cambridge Extended, Edexcel Higher
Interior angles of an n-sided polygon = $(n - 2) \times 180°$	No	All tiers; exterior angles sum to 360°
Similar shapes: lengths × k, areas × k^2, volumes × k^3	No	Cambridge Extended, Edexcel Higher
Cosine rule rearranged for an angle: $\cos A = (b^2 + c^2 - a^2) \div 2bc$	No	The printed version is for a side
Exact values of sin, cos and tan at 0°, 30°, 45°, 60° (and 90° for sin and cos)	No	Required at Cambridge Extended (E6.3)
Magnitude of a vector $(x, y) = \sqrt{(x^2 + y^2)}$	No	Cambridge Extended, Edexcel Higher

Probability and statistics results to know by heart for IGCSE

Formula	Given in exam?	Notes
P(not A) = 1 − P(A)	No	All tiers
Mutually exclusive events: P(A or B) = P(A) + P(B)	No	All tiers
Independent events: P(A and B) = P(A) × P(B)	No	All tiers
Expected frequency = probability × number of trials	No	All tiers
Estimated mean = Σ(frequency × midpoint) ÷ Σfrequency	No	All tiers
Interquartile range = upper quartile − lower quartile	No	Cambridge Extended, Edexcel Higher
Frequency density = frequency ÷ class width	No	Cambridge Extended, Edexcel Higher
Conditional probability	No	Cambridge Extended works it from diagrams and tables; its syllabus says formula notation is not required

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