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IGCSE Maths Formula Sheet

Every Formula, and Which of the Four Official Sheets Gives It

ALL FOUR SHEETS

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30 formulae compared across all 4 official sheets, then set out in full across 5 topics. Edexcel Foundation and Higher, Cambridge Core and Extended.

Which Sheet Gives What

Find your own sheet in the column headings, then read down it. Given means it is printed in your exam paper. Memorise means it is assessed but never given. Not on spec means the topic is not on your course at all.

Formula	Edexcel Foundation	Edexcel Higher	Cambridge Core	Cambridge Extended
AREA AND PERIMETER				
Area of a triangle ($\frac{1}{2} \times \text{base} \times \text{height}$)	MEMORISE	MEMORISE	GIVEN	GIVEN
Area of a circle (πr^2)	MEMORISE	MEMORISE	GIVEN	GIVEN
Circumference of a circle ($2\pi r$)	MEMORISE	MEMORISE	GIVEN	GIVEN
Area of a trapezium	GIVEN	GIVEN	MEMORISE	MEMORISE
VOLUME AND SURFACE AREA				
Volume of a prism	GIVEN	GIVEN	GIVEN	GIVEN
Volume of a cylinder	GIVEN	GIVEN	GIVEN	GIVEN
Curved surface area of a cylinder	GIVEN	GIVEN	GIVEN	GIVEN
Volume of a pyramid	Not on spec	Not on spec	GIVEN	GIVEN
Volume of a cone	Not on spec	GIVEN	GIVEN	GIVEN
Curved surface area of a cone	Not on spec	GIVEN	GIVEN	GIVEN
Volume of a sphere	Not on spec	GIVEN	GIVEN	GIVEN
Surface area of a sphere	Not on spec	GIVEN	GIVEN	GIVEN
ALGEBRA				
Quadratic formula	Not on spec	GIVEN	Not on spec	GIVEN
Difference of two squares	MEMORISE	MEMORISE	Not on spec	MEMORISE
Completing the square	Not on spec	MEMORISE	Not on spec	MEMORISE
nth term of an arithmetic sequence	MEMORISE	MEMORISE	MEMORISE	MEMORISE

Formula	Edexcel Foundation	Edexcel Higher	Cambridge Core	Cambridge Extended
Sum of an arithmetic series	<i>Not on spec</i>	GIVEN	<i>Not on spec</i>	<i>Not on spec</i>
TRIGONOMETRY				
Pythagoras' theorem	MEMORISE	MEMORISE	MEMORISE	MEMORISE
SOH CAH TOA	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Sine rule	<i>Not on spec</i>	GIVEN	<i>Not on spec</i>	GIVEN
Cosine rule	<i>Not on spec</i>	GIVEN	<i>Not on spec</i>	GIVEN
Area of a triangle ($\frac{1}{2}ab \sin C$)	<i>Not on spec</i>	GIVEN	<i>Not on spec</i>	GIVEN
COORDINATE GEOMETRY				
Gradient of a line	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Equation of a line ($y = mx + c$)	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Midpoint of a line segment	MEMORISE	MEMORISE	<i>Not on spec</i>	MEMORISE
Distance between two points	<i>Not on spec</i>	MEMORISE	<i>Not on spec</i>	MEMORISE
STATISTICS, PROBABILITY AND FINANCE				
Mean	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Probability of an event	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Relative frequency	MEMORISE	MEMORISE	MEMORISE	MEMORISE
Compound interest	MEMORISE	MEMORISE	MEMORISE	MEMORISE

The Formulae

Organised by topic, in the order they appear in the full guide.

Algebra Formulae

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

Difference of two squares: $a^2 - b^2 = (a + b)(a - b)$

Completing the square: $x^2 + bx = (x + b/2)^2 - (b/2)^2$

nth term of arithmetic sequence: $a + (n - 1)d$

Sum of arithmetic series: $S = n/2 \times (2a + (n - 1)d)$

QUADRATIC FORMULA

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

DIFFERENCE OF TWO SQUARES

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

COMPLETING THE SQUARE (WHEN A = 1)

$$x^2 + bx = \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2$$

COMPLETING THE SQUARE (WITH CONSTANT C)

$$x^2 + bx + c = \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c$$

COMPLETING THE SQUARE (WHEN A ≠ 1)

$$ax^2 + bx + c = a \left(x + \frac{b}{2a}\right)^2 + \left(c - \frac{b^2}{4a}\right)$$

NTH TERM OF ARITHMETIC SEQUENCE

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

SUM OF ARITHMETIC SERIES

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

Geometry and Mensuration Formulae

Area of triangle: $\frac{1}{2} \times \text{base} \times \text{height}$

Area of trapezium: $\frac{1}{2}(a + b) \times h$

Area of circle: πr^2

Circumference of a circle: $C = 2\pi r$ or πd

Volume of cylinder: $\pi r^2 h$

Volume of a pyramid: $V = \frac{1}{3} \times \text{base area} \times \text{height}$

Volume of cone: $\frac{1}{3}\pi r^2 h$

Volume of sphere: $\frac{4}{3}\pi r^3$

Pythagoras' theorem: $a^2 + b^2 = c^2$

AREA OF TRIANGLE

$$A = \frac{1}{2} \times \text{base} \times \text{height}$$

AREA OF TRAPEZIUM

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

AREA OF CIRCLE

$$A = \pi r^2$$

CIRCUMFERENCE OF A CIRCLE

$$C = 2\pi r \quad C = \pi d$$

VOLUME OF CYLINDER

$$V = \pi r^2 h$$

VOLUME OF A PYRAMID

$$V = \frac{1}{3}Ah$$

VOLUME OF CONE

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

VOLUME & SURFACE AREA OF SPHERE

$$V = \frac{4}{3}\pi r^3 \quad SA = 4\pi r^2$$

PYTHAGORAS' THEOREM

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

Trigonometry Formulae

SOH CAH TOA

Sine rule: $a / \sin A = b / \sin B = c / \sin C$

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

Area of triangle: $\frac{1}{2}ab \sin C$

SOH CAH TOA

$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}} \quad \cos \theta = \frac{\text{Adj}}{\text{Hyp}} \quad \tan \theta = \frac{\text{Opp}}{\text{Adj}}$$

SINE RULE

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

COSINE RULE

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

AREA OF TRIANGLE (TRIG)

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

Statistics and Probability Formulae

Mean = sum of all values ÷ number of values

Probability: $P(A)$ = favourable outcomes / total outcomes

Relative frequency = number of successes / number of trials

MEAN

$$\bar{x} = \frac{\sum x}{n}$$

PROBABILITY

$$P(A) = \frac{\text{favourable outcomes}}{\text{total outcomes}}$$

Coordinate Geometry Formulae

Gradient: $m = (y_2 - y_1) / (x_2 - x_1)$

Equation of a line: $y = mx + c$ or $y - y_1 = m(x - x_1)$

Midpoint: $((x_1 + x_2) / 2, (y_1 + y_2) / 2)$

Distance: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

GRADIENT

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

EQUATION OF A LINE

$$y - y_1 = m(x - x_1)$$

MIDPOINT

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

DISTANCE

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

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