A-level Maths formulae you must learn

AQA (7357) and Pearson Edexcel (9MA0) A-level Mathematics · Checked against the official specifications and booklets on 23 November 2026

These formulae are not printed in the formula booklet you get in the exam. AQA and Edexcel each list them in their specification as formulae you must know, and the two lists are the same. Tick each box when you can write the formula from memory, then use the test on the next pages. AQA adds that one of these may be printed in a question only when it is the starting point for a proof or the result to be proved.

Pure mathematics

☐ **Quadratic equations**

$ax^2 + bx + c = 0$ has roots $x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$

☐ **Laws of indices**

$a^x a^y \equiv a^{x+y}$

$a^x \div a^y \equiv a^{x-y}$

$(a^x)^y \equiv a^{xy}$

☐ **Laws of logarithms**

$x = a^n \Leftrightarrow n = \log_a x$, for $a > 0$ and $x > 0$

$\log_a x + \log_a y \equiv \log_a (xy)$

$\log_a x - \log_a y \equiv \log_a (x/y)$

$k \log_a x \equiv \log_a (x^k)$

☐ **Coordinate geometry**

A straight line with gradient m through (x_1, y_1) has equation $y - y_1 = m(x - x_1)$

Lines with gradients m_1 and m_2 are perpendicular when $m_1 m_2 = -1$

☐ **Sequences**

General term of an arithmetic progression: $u_n = a + (n - 1)d$

General term of a geometric progression: $u_n = ar^{n-1}$

☐ **Trigonometry in triangle ABC**

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

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

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

☐ **Trigonometric identities**

$\cos^2 A + \sin^2 A \equiv 1$

$\sec^2 A \equiv 1 + \tan^2 A$

$\operatorname{cosec}^2 A \equiv 1 + \cot^2 A$

$\sin 2A \equiv 2 \sin A \cos A$

$\cos 2A \equiv \cos^2 A - \sin^2 A$

$\tan 2A \equiv 2 \tan A / (1 - \tan^2 A)$

☐ **Mensuration**

Circle, radius r and diameter d: $C = 2\pi r = \pi d$ and $A = \pi r^2$

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

Area of a trapezium = ½(a + b)h, where a and b are the parallel sides and h is their perpendicular separation

Volume of a prism = area of cross section × length

Arc and sector, angle θ in radians at the centre: $s = r\theta$ and $A = \frac{1}{2}r^2\theta$

☐ **Differentiation**

$x^n \to nx^{n-1}$

$\sin kx \to k\cos kx$; $\cos kx \to -k\sin kx$

$e^{kx} \to ke^{kx}$; $\ln x \to 1/x$

$f(x) + g(x) \to f'(x) + g'(x)$

$f(x)g(x) \to f'(x)g(x) + f(x)g'(x)$ (product rule)

$f(g(x)) \to f'(g(x))g'(x)$ (chain rule)

☐ **Integration**

$\int x^n\,dx = x^{n+1}/(n+1) + c$, $n \neq -1$

$\int \cos kx\,dx = (1/k)\sin kx + c$; $\int \sin kx\,dx = -(1/k)\cos kx + c$

$\int e^{kx}\,dx = (1/k)e^{kx} + c$; $\int 1/x\,dx = \ln|x| + c$, $x \neq 0$

$\int (f'(x) + g'(x))\,dx = f(x) + g(x) + c$

$\int f'(g(x))g'(x)\,dx = f(g(x)) + c$

Area under a curve = $\int_a^b y\,dx$ $(y \geq 0)$

☐ **Vectors**

$|xi + yj + zk| = \sqrt{(x^2 + y^2 + z^2)}$

Statistics

☐ **Mean of a set of data**

$\bar{x} = \Sigma x/n = \Sigma fx/\Sigma f$

☐ **Standard Normal variable**

$Z = (X - \mu)/\sigma$, where $X \sim N(\mu, \sigma^2)$

Mechanics

☐ **Forces and equilibrium**

Weight = mass × g

Friction: $F \leq \mu R$

Newton's second law: $F = ma$

☐ **Kinematics: variable acceleration**

$v = dr/dt$

$a = dv/dt = d^2r/dt^2$

$r = \int v\,dt$; $v = \int a\,dt$

Test yourself: write each formula from memory

Cover the first pages and fill in the gaps. Then check against the formula boxes and re-learn any you missed.

Pure mathematics

Quadratic equations

$ax^2 + bx + c = 0$ has roots $x =$

Laws of indices

$a^x a^y \equiv$

$a^x \div a^y \equiv$

$(a^x)^y \equiv$

Laws of logarithms

$x = a^n \Leftrightarrow n =$

$\log_a x + \log_a y \equiv$

$\log_a x - \log_a y \equiv$

$k \log_a x \equiv$

Coordinate geometry

Line with gradient m through (x_1, y_1):

Lines perpendicular when:

Sequences

Arithmetic: $u_n =$

Geometric: $u_n =$

Trigonometry in triangle ABC

Sine rule: $a/\sin A =$

Cosine rule: $a^2 =$

Area =

Trigonometric identities

$\cos^2 A + \sin^2 A \equiv$

$\sec^2 A \equiv$

$\operatorname{cosec}^2 A \equiv$

$\sin 2A \equiv$

$\cos 2A \equiv$

$\tan 2A \equiv$

Mensuration

Circle: C =

Circle: A =

Pythagoras:

Trapezium area =

Prism volume =

Arc length s =

Sector area A =

Differentiation

$d/dx\ (x^n) =$

$d/dx\ (\sin kx) =$

$d/dx\ (\cos kx) =$

$d/dx\ (e^{kx}) =$

$d/dx\ (\ln x) =$

$d/dx\ [f(x)g(x)] =$

$d/dx\ [f(g(x))] =$

Integration

$\int x^n\ dx =$

$\int \cos kx\ dx =$

$\int \sin kx\ dx =$

$\int e^{kx}\ dx =$

$\int 1/x\ dx =$

$\int f'(g(x))g'(x)\ dx =$

Area under a curve =

Vectors

$|xi + yj + zk| =$

Statistics

Mean of a set of data

$\bar{x} =$

Standard Normal variable

Z =

where X ~

Mechanics

Forces and equilibrium	
Weight =	
Friction: $F \leq$	
Newton’s second law: $F =$	

Kinematics: variable acceleration	
$v =$	
$a =$	
$r =$	
$v =$	

Official sources

AQA: AS and A-level Mathematics specification (7356/7357), v1.3, Appendix B: mathematical formulae and identities
Pearson Edexcel: A level Mathematics specification (9MA0), Issue 4, Appendix 1: Formulae

An original MathsDaily revision sheet, not an official exam board document. Specifications can be updated: check the current version from your exam board.