Maths · Revision

GCSE Formula Sheet

The formulas that come up most. Exam boards give you some in the paper and expect you to memorise others, so check your own board's list.

Number

What	Formula
Percentage change	(change ÷ original) × 100
Compound growth	final = start × $(1 + r/100)^n$
Compound decay	final = start × $(1 - r/100)^n$
Reverse percentage	original = new amount ÷ multiplier

Algebra

What	Formula
Straight line	$y = mx + c$
Gradient	$m = (y_2 - y_1) \div (x_2 - x_1)$
Midpoint	$((x_1 + x_2) \div 2, (y_1 + y_2) \div 2)$
Difference of two squares	$a^2 - b^2 = (a + b)(a - b)$
Quadratic formula, for $ax^2 + bx + c = 0$	$x = (-b \pm \sqrt{(b^2 - 4ac)}) \div 2a$

Index laws

Rule	Example
$a^m \times a^n = a^{m+n}$	$x^3 \times x^4 = x^7$
$a^m \div a^n = a^{m-n}$	$x^5 \div x^2 = x^3$
$(a^m)^n = a^{mn}$	$(x^2)^3 = x^6$
$a^0 = 1$	$7^0 = 1$
$a^{-n} = 1 \div a^n$	$2^{-3} = 1/8$

Area and circles

Shape	Formula
Triangle	½ × base × height
Parallelogram	base × height
Trapezium	½ × (a + b) × h
Circle area	πr^2
Circumference	πd or $2\pi r$
Sector area	$(\theta \div 360) \times \pi r^2$
Arc length	$(\theta \div 360) \times \pi d$

Volume and surface area

Shape	Formula
Prism	cross-section area × length
Cylinder	volume $\pi r^2 h$, curved surface $2\pi rh$
Cone	volume $\frac{1}{3}\pi r^2 h$, curved surface πrl
Sphere	volume $(4/3)\pi r^3$, surface $4\pi r^2$
Pyramid	⅓ × base area × height

Triangles

What	Formula
Pythagoras	$a^2 + b^2 = c^2$ (c is the hypotenuse)
SOH CAH TOA	$\sin\theta = O/H$, $\cos\theta = A/H$, $\tan\theta = O/A$
Sine rule	$a/\sin A = b/\sin B = c/\sin C$
Cosine rule	$a^2 = b^2 + c^2 - 2bc\cos A$
Area of any triangle	½ab sin C

Compound measures

What	Formula
Speed	distance ÷ time
Density	mass ÷ volume
Pressure	force ÷ area

Probability

What	Formula
Not happening	P(not A) = 1 − P(A)
A or B, mutually exclusive	P(A or B) = P(A) + P(B)
A and B, independent	P(A and B) = P(A) × P(B)