GCSE Maths Formulas

What the exam gives you, and what must be learned

What the official GCSE maths formulae sheet contains

Foundation and Higher sheets, as published for the 2025 to 2027 exams.

Formula	Given on the sheet?	Example
Area of a trapezium = ½(a + b)h	Yes, Foundation and Higher	a = 5, b = 9, h = 4: area = 28
Volume of a prism = area of cross-section × length	Yes, Foundation and Higher	Cross-section 12 cm², length 10 cm: 120 cm³
Circumference of a circle = 2πr = πd	Yes, Foundation and Higher	r = 5: 10π ≈ 31.4
Area of a circle = πr²	Yes, Foundation and Higher	r = 6: 36π
Pythagoras' theorem: a² + b² = c², c the hypotenuse	Yes, Foundation and Higher	Legs 6 and 8: hypotenuse 10
sin A = a/c, cos A = b/c, tan A = a/b (right-angled triangle)	Yes, Foundation and Higher	Opposite 5, hypotenuse 10: sin A = 0.5, so A = 30°
Compound interest: total accrued = $P(1 + r/100)^n$	Yes, Foundation and Higher	£500 at 4% for 3 years: £562.43
P(A or B) = P(A) + P(B) − P(A and B)	Yes, Foundation and Higher	0.5 + 0.4 − 0.2 = 0.7
Quadratic formula: $x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$	Higher only	$x^2 + 4x - 7 = 0$: x = 1.32 or −5.32
Sine rule: a/sin A = b/sin B = c/sin C	Higher only	Two angles and a side known
Cosine rule: a² = b² + c² − 2bc cos A	Higher only	Two sides and the angle between them
Area of a triangle = ½ab sin C	Higher only	7, 9 and 40°: 20.2 cm²
P(A and B) = P(A given B) × P(B)	Higher only	0.3 × 0.5 = 0.15

Formulae given in the GCSE maths question when needed

The DfE subject content says these are not to be memorised: when a question needs one, the question prints it. Substituting into them confidently is the skill.

Formula	Given on the sheet?	Example
Volume of a cone = ⅓πr²h	No — printed in the question	r = 3, h = 10: 30π

Formula	Given on the sheet?	Example
Curved surface area of a cone = πrl, l the slant height	No — printed in the question	r = 3, l = 5: 15π
Volume of a sphere = $\frac{4}{3}\pi r^3$	No — printed in the question	r = 3: 36π
Surface area of a sphere = $4\pi r^2$	No — printed in the question	r = 3: 36π
Kinematics: v = u + at, s = ut + ½at², $v^2 = u^2 + 2as$	No — printed in the question	u = 0, a = 2, t = 5: v = 10

GCSE maths formulae your child must still memorise

Not on the sheet and not printed in questions. Several of these come up far more often than anything about cones or spheres, especially at Foundation.

Formula	Given on the sheet?	Example
Area of a triangle = ½ × base × perpendicular height	No — learn it	Base 10, height 6: 30
Area of a parallelogram = base × perpendicular height	No — learn it	Base 8, height 5: 40
Volume of a cylinder = $\pi r^2 h$	No — learn it (a prism with a circular cross-section)	r = 3, h = 10: 90π
Curved surface area of a cylinder = 2πrh	No — learn it	r = 3, h = 10: 60π
Volume of a pyramid = ⅓ × base area × height	No — learn it	Base 36, height 5: 60
Arc length = (θ/360) × 2πr; sector area = (θ/360) × πr^2	No — learn it	90°, r = 4: arc 2π, sector 4π
Interior angles of an n-sided polygon sum to (n − 2) × 180°	No — learn it	Hexagon: 720°
Exterior angle of a regular polygon = 360° ÷ n	No — learn it	Exterior 24°: 15 sides
Speed = distance ÷ time; density = mass ÷ volume; pressure = force ÷ area	No — learn it	150 km in 2.5 h: 60 km/h
Percentage change = change ÷ original × 100	No — learn it	£40 to £50: 25% increase
Multiplier: 1 + r/100 up, 1 − r/100 down; reverse percentage = new ÷ multiplier	No — learn it	£92 after +15%: £92 ÷ 1.15 = £80
Straight line y = mx + c; gradient = change in y ÷ change in x	No — learn it	(1, 3) to (3, 7): m = 2
Perpendicular gradients multiply to −1 (Higher)	No — learn it	m = 2: perpendicular m = −½
Circle centred at the origin: $x^2 + y^2 = r^2$ (Higher)	No — learn it	Radius 5: $x^2 + y^2 = 25$

Formula	Given on the sheet?	Example
Difference of two squares: $a^2 - b^2 = (a + b)(a - b)$	No — learn it	$x^2 - 49 = (x + 7)(x - 7)$
nth term of a linear sequence = dn + (first term − d)	No — learn it	7, 11, 15…: 4n + 3
Exact trig values for 0°, 30°, 45°, 60°, 90°	No — learn it	sin 30° = ½; tan 45° = 1; cos 30° = √3/2
P(not A) = 1 − P(A); independent events: P(A and B) = P(A) × P(B)	No — learn it	0.3 and 0.5 independent: 0.15
Expected frequency = trials × probability	No — learn it	200 spins at 0.25: 50
Estimated mean = Σfx ÷ Σf	No — learn it	Midpoints × frequencies, over the total
Frequency density = frequency ÷ class width (Higher)	No — learn it	Frequency 30, width 5: 6
Similar shapes: length factor k gives area × k^2, volume × k^3 (Higher)	No — learn it	k = 3: area × 9, volume × 27

From **ClassArc**, live one-to-one online maths tutoring with the same teacher every week. Full guide, updates and answers to common questions: **theclassarc.com/resources/gcse-formula-sheet**. Free to print and share with students and families; please do not sell it or remove this footer. If you share it online, link to the page above rather than uploading the file, so everyone gets the latest version.