IGCSE Maths formula sheet: given vs learn

Cambridge prints a list of formulas on page 2 of every 0580 paper (green table). Everything in the orange tables is **not** given, so learn it.

Given in the exam (page 2 of every paper)

Topic	Formula	Note
Triangle area	**$A = \frac{1}{2}bh$**	Core and Extended
Circle	**$A = \pi r^2$, $C = 2\pi r$**	Core and Extended
Cylinder, cone, sphere: surface	**$A = 2\pi rh$ (curved), $A = \pi rl$ (curved), $A = 4\pi r^2$**	Core and Extended
Prism, pyramid	**$V = Al$, $V = \frac{1}{3}Ah$**	Core and Extended
Cylinder, cone, sphere: volume	**$V = \pi r^2 h$, $V = \frac{1}{3}\pi r^2 h$, $V = \frac{4}{3}\pi r^3$**	Core and Extended
Quadratic formula	**$x = (-b \pm \sqrt{(b^2 - 4ac)}) \div 2a$**	Extended only
Sine rule	**$a \div \sin A = b \div \sin B = c \div \sin C$**	Extended only
Cosine rule	**$a^2 = b^2 + c^2 - 2bc \cos A$**	Extended only
Area of any triangle	**Area = $\frac{1}{2}ab \sin C$**	Extended only

Learn these: number and algebra

Topic	Formula	Note
Percentage change	**(change ÷ original) × 100**	Use the original value
Simple interest	**I = PRT ÷ 100**	P principal, R rate %, T years
Compound interest	**$A = P(1 + r/100)^n$**	n = number of years
Speed, density	**speed = distance ÷ time; density = mass ÷ volume**	
Standard form	**$a \times 10^n$, where $1 \le a < 10$**	
Index laws	**$a^m \times a^n = a^{m+n}$; $a^m \div a^n = a^{m-n}$; $(a^m)^n = a^{mn}$; $a^0 = 1$; $a^{-n} = 1/a^n$**	a^(1/n) = $\sqrt[n]{a}$
Expanding	**$(a + b)^2 = a^2 + 2ab + b^2$; $a^2 - b^2 = (a - b)(a + b)$**	
Linear sequence	**nth term = dn + (a - d)**	d difference, a first term

Learn these: geometry, trigonometry, probability and statistics

Topic	Formula	Note
Gradient	**$m = (y_2 - y_1) \div (x_2 - x_1)$**	
Straight line	**$y = mx + c$**	c = y-intercept
Parallel / perpendicular	**same m / $m_1 \times m_2 = -1$**	
Midpoint	**$((x_1 + x_2) \div 2, (y_1 + y_2) \div 2)$**	
Length of a line	**$\sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$**	
Angles	**line 180°, point 360°, triangle 180°**	
Polygons	**interior sum (n − 2) × 180°; exterior angles add to 360°**	regular: each exterior = 360° ÷ n
Rectangle, parallelogram, trapezium	**lw; bh; ½(a + b)h**	
Arc length, sector area	**$(\theta \div 360) \times 2\pi r$; $(\theta \div 360) \times \pi r^2$**	
Similar shapes	**length × k, area × k^2, volume × k^3**	Extended
Pythagoras	**$a^2 + b^2 = c^2$**	c = hypotenuse
SOH CAH TOA	**sin = O ÷ H, cos = A ÷ H, tan = O ÷ A**	right-angled triangles
Exact values	**sin 30° = cos 60° = ½; tan 45° = 1; sin 60° = cos 30° = $\sqrt{3}/2$**	
Bearings	**clockwise from north, three figures**	e.g. 045°
Probability	**P(not A) = 1 − P(A); P(A and B) = P(A) × P(B) if independent**	expected frequency = P × number of trials
Mean from a table	**$\Sigma fx \div \Sigma f$**	
Vector magnitude	**$\sqrt{(x^2 + y^2)}$**	Extended

Worked example: compound interest
$5000 at 4% a year for 3 years
$A = 5000 \times 1.04^3 =$ **$5624.32**

Worked example: sector
Radius 6 cm, angle 60°
Arc $= (60 \div 360) \times 2\pi \times 6 = 2\pi \approx$ **6.28 cm**

Self-test (answers at the bottom)

1. Increase 250 by 12%.
2. Find the gradient of the line through (1, 2) and (4, 11).
3. Find the midpoint of (2, -3) and (8, 5).
4. Find the area of a sector with radius 10 cm and angle 72°, in terms of π.
5. The shorter sides of a right-angled triangle are 5 cm and 12 cm. Find the hypotenuse.
6. Find each exterior angle of a regular octagon.
7. Write 36 000 in standard form.
8. Simplify $x^5 \times x^3 \div x^2$.

Answers: 1. 280 2. 3 3. (5, 1) 4. 20π cm² 5. 13 cm 6. 45° 7. 3.6×10^4 8. x^6