IGCSE O-Levels Mathematics - Formula Sheet

■ ALGEBRA:

1. $(a + b)^2 = a^2 + 2ab + b^2$
2. $(a - b)^2 = a^2 - 2ab + b^2$
3. $(a + b)(a - b) = a^2 - b^2$
4. Quadratic Formula: $x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$

■ GEOMETRY:

1. Area of Triangle = 1/2 × base × height
2. Area of Circle = πr^2
3. Circumference of Circle = $2\pi r$
4. Pythagoras: $a^2 + b^2 = c^2$
5. Trigonometry: $\sin\theta$ = opp/hyp, $\cos\theta$ = adj/hyp, $\tan\theta$ = opp/adj

■ MENSURATION:

1. Volume of Cuboid = l × b × h
2. Volume of Sphere = $4/3\ \pi r^3$
3. Surface Area of Sphere = $4\pi r^2$
4. Volume of Cylinder = $\pi r^2 h$
5. Surface Area of Cylinder = $2\pi r(h + r)$
6. Volume of Cone = $1/3\ \pi r^2 h$
7. Surface Area of Cone = $\pi r(l + r)$

■ COORDINATE GEOMETRY:

1. Midpoint = $((x1 + x2)/2 , (y1 + y2)/2)$
2. Distance = $\sqrt{((x2 - x1)^2 + (y2 - y1)^2)}$
3. Gradient = $(y2 - y1) / (x2 - x1)$
4. Equation of Line: $y - y1 = m(x - x1)$

■ PROBABILITY & STATISTICS:

1. Probability = Number of favourable outcomes / Total outcomes
2. Mean = $\Sigma x / n$
3. Gradient of Line of Best Fit = rise/run

■ SEQUENCES & SERIES:

1. nth term (arithmetic) = $a + (n-1)d$
2. Sum of n terms (arithmetic): $S = n/2 [2a + (n-1)d]$
3. nth term (geometric) = $ar^{(n-1)}$

4. Sum of n terms (geometric): S = a(1-r^n) / (1-r) (if r ≠ 1)

■ CALCULUS (if included):

1. dy/dx of x^n = n x^(n-1)
2. ∫ x^n dx = (x^(n+1))/(n+1) + C (n ≠ -1)

■ Remember: Always keep units consistent (cm, m, etc.).