Cambridge IGCSE Mathematics (0580)

Core & Extended Revision Sheet

Strictly aligned to the 2025–2027 syllabus — Free resource from **https://igcsegradecalc.site**

1. Number

- Natural, integers, primes, squares, cubes, rational, irrational, real numbers.
- Laws of indices: $a^m a^n = a^{m+n}$, $\dfrac{a^m}{a^n} = a^{m-n}$, $(a^m)^n = a^{mn}$, $a^0 = 1$, $a^{-n} = \dfrac{1}{a^n}$.
- Standard form: $A \times 10^n$ where $1 \le A < 10$.
- Bounds: measurement to d d.p. $\Rightarrow$ lower = value $-\frac{1}{2} \times 10^{-d}$, upper = value $+\frac{1}{2} \times 10^{-d}$.
- Percentage change $= \dfrac{\text{change}}{\text{original}} \times 100\%$. Reverse: original $= \dfrac{\text{final}}{1 \pm r/100}$.
- Simple interest $I = \dfrac{Prt}{100}$. Compound / growth $A = P\left(1 + \frac{r}{100}\right)^n$.
- Ratio, direct proportion $y = kx$, inverse proportion $y = \dfrac{k}{x}$.

2. Algebra & Graphs

- Expand & factorise (common factor, difference of squares $a^2 - b^2 = (a-b)(a+b)$, quadratics).
- Algebraic fractions: simplify, $+ \; - \; \times \; \div$.
- Linear equations & inequalities (reverse inequality when $\times$ or $\div$ by negative).
- Simultaneous equations (elimination / substitution).
- Quadratic formula (given on Extended paper): $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
- Arithmetic sequence: $a_n = a + (n-1)d$. Geometric: $a_n = ar^{n-1}$.
- Functions (Ext.): domain, range, composite $fg(x)$, inverse f^{-1}.
- Graphs: linear $y = mx + c$, quadratic, cubic, reciprocal, exponential.

3. Coordinate Geometry

- Gradient $m = \dfrac{y_2 - y_1}{x_2 - x_1}$. Parallel $\Rightarrow$ equal gradients. Perpendicular $\Rightarrow m_1 m_2 = -1$.
- Distance $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$.
- Equation of a straight line: $y = mx + c$ or $y - y_1 = m(x - x_1)$.

4. Geometry

- Angles on a straight line = 180°, at a point = 360°, vertically opposite equal.
- Parallel lines: corresponding / alternate equal, co-interior supplementary.
- Triangle angle sum = 180°. Exterior angle = sum of opposite interior angles.
- Polygon interior sum $= (n-2) \times 180°$. Regular exterior angle $= \dfrac{360°}{n}$.
- Congruence: SSS, SAS, ASA, RHS. Similarity: AA, SSS, SAS (sides proportional).

- Circle theorems (Ext.): angle at centre = twice angle at circumference; angles in same segment; cyclic quadrilateral opposite angles sum 180°; alternate segment; tangent $\perp$ radius.

5. Mensuration (Formulas)

Shape	Formula
Triangle area	$\frac{1}{2}bh$ or $\frac{1}{2}ab\sin C$ (Ext.)
Circle area / circumference	πr^2 / $2\pi r$ (given)
Sector / Arc	$\frac{\theta}{360}\pi r^2$ / $\frac{\theta}{360}2\pi r$
Prism volume	cross-section area $\times$ length
Cylinder volume	$\pi r^2 h$ (given)
Cone volume / curved SA	$\frac{1}{3}\pi r^2 h$ / $\pi r l$ (given Ext.)
Sphere volume / SA	$\frac{4}{3}\pi r^3$ / $4\pi r^2$ (given Ext.)
Pyramid volume	$\frac{1}{3}\times$ base area $\times$ height (given)

6. Trigonometry

- SOH-CAH-TOA & Pythagoras $a^2 + b^2 = c^2$.
- Exact values (Ext.): $\sin 30° = \frac{1}{2}$, $\cos 30° = \frac{\sqrt{3}}{2}$, $\tan 30° = \frac{1}{\sqrt{3}}$; 45°: $\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}, 1$; 60°: $\frac{\sqrt{3}}{2}, \frac{1}{2}, \sqrt{3}$.
- Sine rule (Ext., given): $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$.
- Cosine rule (Ext., given): $a^2 = b^2 + c^2 - 2bc\cos A$.
- Area of triangle (Ext., given): $\frac{1}{2}ab\sin C$.

7. Transformations & Vectors

- Translation (column vector), reflection, rotation, enlargement (scale factor + centre).
- Vectors (Ext.): $\begin{pmatrix} x \\ y \end{pmatrix}$, magnitude $|\mathbf{v}| = \sqrt{x^2 + y^2}$, addition, scalar multiple.

8. Probability

- $P(A) = \dfrac{\text{favourable}}{\text{total}}$. $P(A') = 1 - P(A)$.
- Independent: $P(A \cap B) = P(A)P(B)$. Mutually exclusive: $P(A \cup B) = P(A) + P(B)$.
- Tree diagrams, Venn diagrams, conditional probability (Ext.).

9. Statistics

- Mean, median, mode, range. Grouped mean $\approx \dfrac{\sum fx}{\sum f}$.
- Cumulative frequency, box plots, IQR $= Q_3 - Q_1$.
- Histograms (Ext.): frequency density $= \dfrac{\text{frequency}}{\text{class width}}$; area $\propto$ frequency.