

O-Level E-Math Formula Sheet

O-Level and SEC (G3) · Mathematics



The Singapore Syllabus

PRINTED IN THE PAPER

Formulae the O-Level E-Math paper gives you

In the order SEAB prints them. You do not need to memorise these, but you do need to know when to use each one.

COMPOUND INTEREST

Total amount

$$P \left(1 + \frac{r}{100} \right)^n$$

MENSURATION

Curved surface area of a cone

$$\pi r l$$

Surface area of a sphere

$$4\pi r^2$$

Volume of a cone

$$\frac{1}{3}\pi r^2 h$$

Volume of a sphere

$$\frac{4}{3}\pi r^3$$

Area of triangle ABC

$$\frac{1}{2}ab \sin C$$

Arc length where θ is in radians

$$r\theta$$

Sector area where θ is in radians

$$\frac{1}{2}r^2\theta$$

TRIGONOMETRY

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

STATISTICS

Mean

$$\frac{\sum fx}{\sum f}$$

Standard deviation

$$\sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Formulas the O-Level E-Math paper does not give you

The syllabus expects you to use these, but the paper does not print them.

NUMBER AND ALGEBRA

Simple interest

$$I = \frac{PRT}{100}$$

Percentage change

$$\frac{\text{new} - \text{original}}{\text{original}} \times 100\%$$

Quadratic formula not printed in the E-Math paper

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Laws of indices

$$a^m \times a^n = a^{m+n}, \quad a^m \div a^n = a^{m-n}, \quad (a^m)^n = a^{mn}$$

Zero, negative and fractional indices

$$a^0 = 1, \quad a^{-n} = \frac{1}{a^n}, \quad a^{\frac{1}{n}} = \sqrt[n]{a}$$

Special products

$$(a+b)^2 = a^2 + 2ab + b^2, \quad (a-b)^2 = a^2 - 2ab + b^2, \quad a^2 - b^2 = (a+b)(a-b)$$

Direct and inverse proportion

$$y = kx, \quad y = \frac{k}{x}$$

Average speed

$$\frac{\text{total distance}}{\text{total time}}$$

Speed-time graphs

gradient = acceleration, area under the graph = distance travelled

GEOMETRY AND MEASUREMENT

Pythagoras' theorem

$$a^2 + b^2 = c^2$$

Trigonometric ratios

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}, \quad \cos \theta = \frac{\text{adj}}{\text{hyp}}, \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Obtuse angles

$$\sin(180^\circ - A) = \sin A, \quad \cos(180^\circ - A) = -\cos A$$

Area of a parallelogram and a trapezium

$$bh, \quad \frac{1}{2}(a+b)h$$

Circle

$$\text{area} = \pi r^2, \quad \text{circumference} = 2\pi r$$

Volume of a prism or cylinder

$$\text{base area} \times \text{height}, \quad V = \pi r^2 h$$

Volume of a pyramid

$$\frac{1}{3} \times \text{base area} \times \text{height}$$

Surface area of a cylinder

$$\text{curved} = 2\pi r h, \quad \text{total} = 2\pi r^2 + 2\pi r h$$

Total surface area of a cone

$$\pi r l + \pi r^2$$

Area of a segment θ in radians

$$\frac{1}{2}r^2\theta - \frac{1}{2}r^2 \sin \theta$$

Radians and degrees

$$\pi \text{ rad} = 180^\circ$$

Angles of an n-sided polygon

$$\text{interior sum} = (n - 2) \times 180^\circ, \quad \text{exterior sum} = 360^\circ$$

Similar figures

$$\frac{A_1}{A_2} = \left(\frac{l_1}{l_2}\right)^2, \quad \frac{V_1}{V_2} = \left(\frac{l_1}{l_2}\right)^3$$

Gradient and length of a line segment

$$m = \frac{y_2 - y_1}{x_2 - x_1}, \quad d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Equation of a straight line

$$y = mx + c$$

Magnitude of a vector

$$\left| \begin{pmatrix} x \\ y \end{pmatrix} \right| = \sqrt{x^2 + y^2}$$

STATISTICS AND PROBABILITY**Interquartile range**

$$Q_3 - Q_1$$

Probability

$$P(A) = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}, \quad P(A') = 1 - P(A)$$

Mutually exclusive events

$$P(A \text{ or } B) = P(A) + P(B)$$

Independent events

$$P(A \text{ and } B) = P(A) \times P(B)$$