

Maths Equations to Memorise

Statistics

Compound interest:

$$\text{New value} = \text{original} \times \left(1 + \frac{\% \text{ increase}}{100}\right)^{\text{time}}$$

Depreciation:

$$\text{New value} = \text{original} \times \left(1 + \frac{\% \text{ decrease}}{100}\right)^{\text{time}}$$

Calculating percentage of an amount:

$$\text{Percentage} = \left(\frac{\text{amount}}{\text{total}}\right) \times 100$$

Percentage change:

$$\text{Percentage change} = \left(\frac{\text{new value} - \text{original}}{\text{original}}\right) \times 100$$

Stratified sampling:

$$\text{Amount in sample} = \frac{\text{group number}}{\text{total}} \times \text{sample size}$$

Histograms:

$$\text{Frequency density} = \frac{\text{frequency}}{\text{class width}}$$

Geometry

Area of a triangle:

$$\text{Area of a triangle} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$

$$\text{Area of a triangle} = \frac{1}{2} ab \sin(C)$$

Area of a circle:

$$\text{Area of a circle} = \pi r^2$$

Circumference of a circle:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

Area of a sector:

$$\text{Area of a sector} = \left(\frac{\text{angle}}{360}\right) \times \pi r^2$$

Perimeter of a sector:

$$\text{Perimeter of a sector} = \left(\frac{\text{angle}}{360} \times \pi d\right) + 2r$$

Area of parallelogram:

$$\text{Area of a parallelogram} = \text{base} \times \text{vertical height}$$

Area of trapezium:

$$\text{Area of trapezium} = \frac{1}{2}(a + b) \times \text{vertical height}$$

Sum of interior angles for a regular polygon:

$$\text{Sum of interior angles} = (\text{number of sides} - 2) \times 180$$

Interior angle of a regular polygon:

$$\text{Sum of interior angles} = \frac{(\text{number of sides} - 2) \times 180}{\text{number of sides}}$$

Exterior angle of a regular polygon:

$$\text{Exterior angle} = \frac{360}{\text{number of sides}}$$

Volume of a cuboid:

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

Volume of a prism:

$$\text{Volume} = \text{area of cross section} \times \text{length}$$

Volume of a cylinder:

$$\text{Volume} = \pi r^2 h$$

Volume of a pyramid:

$$\text{Volume} = \frac{1}{3} \times \text{area of base} \times \text{vertical height}$$

Pythagoras and Trigonometry

Pythagoras' theorem:

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

Trigonometric ratios:

$$\sin(x) = \frac{\text{opp}}{\text{hyp}}$$

$$\cos(x) = \frac{\text{adj}}{\text{hyp}}$$

$$\tan(x) = \frac{\text{opp}}{\text{adj}}$$

Sine rule:

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

Cosine rule:

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

$$\cos(A) = \frac{b^2 + c^2 - a^2}{2bc}$$

Compound Measures

Speed:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

Density:

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

Pressure:

$$\text{Pressure} = \frac{\text{force}}{\text{area}}$$

Algebra

The quadratic formula:

The solutions of $ax^2 + bx + c = 0$

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

Direct proportionality:

$$y \propto x \rightarrow y = kx$$

(y is proportional to x, x^2)

$$y \propto x^2 \rightarrow y = kx^2$$

Indirect proportionality:

$$y \propto \frac{1}{x} \rightarrow y = \frac{k}{x}$$

(y is inversely proportional to x, x^2)

$$y \propto \frac{1}{x^2} \rightarrow y = \frac{k}{x^2}$$

Probability

Where $P(A)$ and $P(B)$ are the probabilities of two separate events:

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

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