



MATHEMATICS APPLICATIONS

Unit 1 and Unit 2

Formula Sheet

(For use with Year 11 examinations and response tasks)

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This document is valid for teaching and examining from 1 July 2015.

Consumer arithmetic

Simple Interest: $I = Prt$, where P is the principal, r is the rate per year and t is the time in years

Compound Interest: $A = P(1 + r)^t$ compounded annually

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \text{ compounded } n \text{ times a year}$$

Price to earnings ratio: $P/E \text{ ratio} = \frac{\text{Market price per share}}{\text{Annual earnings per share}}$

Shape and measurement

Pythagoras' Theorem: $c^2 = a^2 + b^2$, where c is the hypotenuse of a right triangle ABC , and a, b are the short sides

Circle: $C = 2\pi r = \pi d$, where C is the circumference, r is the radius and d is the diameter
 $A = \pi r^2$, where A is the area

Triangle: $A = \frac{1}{2}bh$ where b is the base and h is the perpendicular height

Parallelogram: $A = bh$

Prism: $V = Ah$, where V is the volume and A is the area of the base

Pyramid: $V = \frac{1}{3}Ah$

Cylinder: $S = 2\pi rh + 2\pi r^2$, where S is the total surface area
 $V = \pi r^2 h$

Cone: $S = \pi rs + \pi r^2$, where s is the slant height
 $V = \frac{1}{3}\pi r^2 h$

Sphere: $S = 4\pi r^2$
 $V = \frac{4}{3}\pi r^3$

Univariate data analysis and the statistical investigation process

In a normal distribution approximately:

68% of values lie within one standard deviation of the mean

95% of values lie within two standard deviations of the mean

99.7% of values lie within three standard deviations of the mean.

Applications of trigonometry

In a right triangle: $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

For any triangle ABC with corresponding length of sides a, b, c

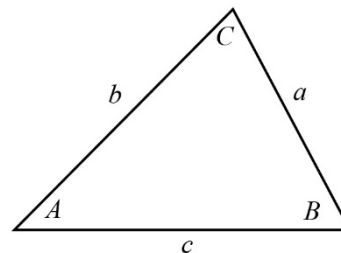
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

$$\text{Area} = \frac{1}{2} ab \sin C$$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)} \quad \text{where } s = \frac{1}{2}(a+b+c) \quad [\text{Heron's rule}]$$



Linear equations and their graphs

Equation of a line: $y = mx + c$, where m = slope; c = y-intercept

Note: Any additional formulas identified by the examination writers as necessary will be included in the body of the particular question.