



MATHEMATICS:

BE QNA AE STINU

FORMULA SHEET 2102

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This document is valid for teaching and examining until 31 December 2012.

Mathematics 3A and 3B Formula Sheet updated July 2012

MATHEMATICS: UNITS 3A AND 3B

2 **FORMULA SHEET**

Numbers and algebra

Index laws:

For a, b > 0 and m, n real.

$$a^m b^m = (a b)^m$$

$$a^m a^n = a^{m+n}$$

$$(a^m)^n = a^{mn}$$

$$\frac{1}{a^m} = a^{-m}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$a^0 = 1$$

For a > 0 and m an integer and n a positive integer,

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$$

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

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

Differentiation:

If
$$f(x) = y$$
 then $f'(x) = \frac{dy}{dx}$

Powers:

If
$$f(x) = x^n$$
 then $f'(x) = nx^{n-1}$ or If $y = x^n$ then $\frac{dy}{dx} = nx^{n-1}$

If
$$y = x^n$$
 then $\frac{dy}{dx} = nx^n$

Product rule:

If
$$y = f(x) g(x)$$

If
$$y =$$

then
$$y' = f'(x) g(x) + f(x) g'(x)$$

or then
$$\frac{dy}{dx} = \frac{du}{dx}v + u\frac{dv}{dx}$$

Integration:

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c, \ n \neq -1$$

Antiderivative:

Given
$$\frac{dy}{dx} = x^n$$
 then $y = \frac{x^{n+1}}{n+1} + c$, $n \neq -1$

See next page

FORMULA SHEET 3 **MATHEMATICS: UNITS 3A AND 3B**

Space and measurement

In any triangle *ABC*:

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

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

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

$$A = \frac{1}{2}ab \sin C$$
, where A is the area

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

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

Parallelogram: A = bh

 $A = \frac{1}{2}(a+b)h$, where a and b are the lengths of the parallel sides Trapezium:

and h is the perpendicular height

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

h is the perpendicular height

 $V = \frac{1}{2} Ah$ Pyramid:

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

 $S = \pi rs + \pi r^2$, where s is the slant height Cone:

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

Sphere: $S = 4\pi r^2$

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

Chance and data

Probability: For any event A and its complement \overline{A}

$$P(A) + P(\overline{A}) = 1$$

In a normal distribution approximately:

68% of values lie within one (1) standard deviation of the mean 95% of values lie within two (2) standard deviations of the mean 99.7% of values lie within three (3) standard deviations of the mean.

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