Government of **Western Australia**
Curriculum Council

WACE
Western Australian Certificate of Education

Mathematics: Units 3A and 3B
Formula sheet

Number and algebra: Estimation and calculation

Index laws:
For $a, b > 0$ and m, n real,

$a^m \, a^n = a^{m+n}$ $\qquad$ $a^m \, b^m = (ab)^m$ $\qquad$ $(a^m)^n = a^{mn}$

$a^{-m} = \frac{1}{a^m}$ $\qquad$ $\frac{a^m}{a^n} = a^{m-n}$ $\qquad$ $a^0 = 1$

For m an integer and n a positive integer $\qquad a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$

Number and algebra: Calculus

Differentiation

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

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

Product rule:

If $h(x) = f(x) \, g(x)$, then $h'(x) = f'(x) \, g(x) + f(x) \, g'(x)$

If $y = uv$ then $\frac{dy}{dx} = v\frac{du}{dx} + u\frac{dv}{dx}$

Integration

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

Space and measurement: Measurement

In any triangle ABC,

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

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

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

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

Space and measurement: Measurement

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

Prism: Volume = Area of base $\times$ height

Cylinder: Total surface area = $2\pi rh + 2\pi r^2$

Volume = $\pi r^2 \times h$

Pyramid: Volume = $\frac{1}{3}\times$ area of base $\times$ height

Cone: Total surface area = $\pi rs + \pi r^2$, s is the slant height

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

Sphere: Total surface area = $4\pi r^2$

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

Chance and data: Quantify chance

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

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.