YEAR 9/10 - FORMULAE SHEET

Financial Mathematics

Simple Interest

$$I = Prn$$

P is initial amount
r is interest rate per period, expressed as a decimal
n is number of periods

Compound Interest

$$A = P(1 + r)^n$$

A is final amount
P is initial amount
r is interest rate per period, expressed as a decimal
n is number of periods

Data Analysis

Mean of a sample

$$\bar{x} = \frac{sum\ of\ scores}{number\ of\ scores}$$

Quadratic Formula

For $ax^2 + bx + c = 0$, the value of x is given by

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

Index Laws

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

$$\frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0)$$

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

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$a^0 = 1 \quad (a \neq 0)$$

$$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$$

Circumference of a circle

$$C = 2\pi r \quad \text{or} \quad C = \pi D$$

r is the radius of a circle
D is the diameter of a circle

Area

Circle

$$A = \pi r^2$$

r is the radius of a circle

Sector

$$A = \frac{\theta}{360} \pi r^2$$

r is the radius of a circle
θ is the number of degrees in central angle

Annulus

$$A = \pi (R^2 - r^2)$$

R is radius of outer circle
r is radius of inner circle

Trapezium

$$A = \frac{h}{2} (a + b)$$

h is perpendicular height
a and b are the lengths of the parallel sides

Rhombus/Kite

$$A = \frac{1}{2} xy$$

x and y are the lengths of the diagonals

Area of land

1 ha = 10 000 m²

Probability of an Event

The probability of an event where outcomes are equally likely is given by:

$$P (event) = \frac{number\ of\ favourable\ outcomes}{total\ number\ of\ outcomes}$$

Surface Area

Closed cylinder

$$SA = 2\pi r^2 + 2\pi rh$$

r is radius, h is perpendicular height

Cone

$$SA = \pi r^2 + \pi rl$$

r is radius , l is slant height

Sphere

$$SA = 4\pi r^2$$

r is radius

Volume

Prism or cylinder

$$V = Ah$$

A is area of base , h is perpendicular height

Pyramid or cone

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

A is area of base , h is perpendicular height
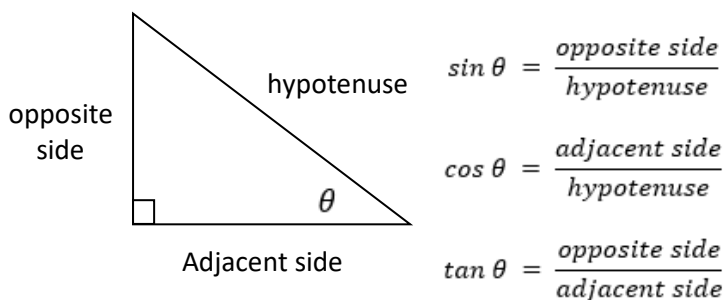
Sphere

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

r is radius

Volume and capacity

$1\ cm^3$ = 1 mL
$1\ m^3$ = 1000 L or 1KL

Trigonometric Ratios

$$sin\ \theta = \frac{opposite\ side}{hypotenuse}$$

$$cos\ \theta = \frac{adjacent\ side}{hypotenuse}$$

$$tan\ \theta = \frac{opposite\ side}{adjacent\ side}$$

Sine rule

In Δ ABC,

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

Cosine rule

In Δ ABC, $c^2 = a^2 + b^2 - 2ab\ cos\ C$

or $\qquad cos\ C = \frac{a^2 + b^2 - c^2}{2ab}$

Area of a Triangle

$$A = \frac{1}{2} absinC$$

Straight Lines

Gradient – intercept form

$$y = mx + c$$

m is gradient
c is y-intercept

Distance

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

Midpoint

$$M = (\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$$

Gradient

$$m = \frac{vertical\ change\ in\ position}{horizontal\ change\ in\ position}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{rise}{run}$$

$$m = \tan \theta$$