Week 1 – Introduction & Time Value of Money

Summation notation

$$\sum_{i=m}^{n} a_i$$

The n is the max value of i (ie the number of iterations is given by n-m), a_i is the function, and m is the starting value for i. For example:

$$\sum_{i=4}^{50}(5i+3) = 23 + 28 + \cdots + 273$$

Laws of summation notation

Multiplicative constants can be brought outside the summation

$$\sum_{i=1}^{n} kx_i = k\sum_{i=1}^{n} x_i$$

Summation of a constant is equal to nk

$$\sum_{i=1}^{n} k = \text{nk}$$

Summations with additions (or subtractions) may be split

$$\sum_{i=1}^{n}(x_i + y_i) = \sum_{i=1}^{n} x_i + \sum_{i=1}^{n} y_i$$

Note that:

$$\sum_{i=1}^{n} {x_i}^2 \neq \left(\sum_{i=1}^{n} x_i\right)^2$$

$\sum_{i=1}^{n} x_i y_i \neq \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i$ (Also applicable for division)

FUNCTIONS

The dependent variable (f(x)) is the value, the independent variable is the argument.

The domain of a function is all possible x values.

The range is the set of all possible f(x) values.

Absolute function is in the form f(x) = |g(x)|

An inverse function involves solving for y and substituting in x, for example:

$f(x) = 5x^2 + 3$

$f^{-1}(y) = ((y-3)/5)^{1/2}$

A function is symmetrical about the x-axis if when y is replaced by –y, the produced equation is the same. Symmetry about y-axis if x is replaced by –x and the same equation is produced. Symmetry about origin if x is replaced by –x and y by –y and same equation produced.