

Maths Refresher

Pre-course Starter Example

We know that a £100 principal (P) invested for one year at an interest rate of 10% (r) will earn interest of £10. Together with the original principal, the amount accrued (A) is given by:

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

If simple interest applied, then £10 would be earned in the second year too. In fact of course, interest is generally compounded. If at the end of the first year:

$$A_1 = P (1 + r)$$

Then at the end of the second year, with compounding:

$$A_2 = A_1 (1 + r) = P (1 + r) (1 + r) = P (1 + r)^2$$

The general **compound interest** formula for t years then is:

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

Example

1 Make up a general Excel formula for compound interest and find:

- (i) the amount after 1 year at 12% with £100
- (ii) the amount after 2 years at 12% with £100

In some accounts, interest is calculated for and paid every quarter. This is an example of **periodic compound interest**, where the formula applying for a year containing k periods is:

$$A = P (1 + r/k)^{kt}$$

Example

2 Make up a formula for periodic compound interest and find:

- (i) the amount after 1 year of 4 quarters at 12% with £100
- (ii) the amount after 2 years of 4 quarters at 12% with £100
- (iii) find out what happens as the number of periods per year (k) in the 2 years is increased, does the amount accrued continue to increase indefinitely?