Compound Interest and Depreciation

Compound Interest

$$\text{Amount} = P\left(1 + \frac{r}{100}\right)^n$$

where P = Principal invested
r = rate % per annum
n = number of years

Ex1 Find Amount when £500 is invested for 7 years at 3% per annum

$$\text{Amount} = 500 \times 1.03^7 = £614.94$$

Depreciation

$$\text{Amount} = P\left(1 - \frac{r}{100}\right)^n$$

Ex2 Find value of car which cost £25000 new when it has depreciated by 15% per annum for 6 years

$$\text{Value} = 25000 \times 0.85^6 = £9428.74$$

Ex3 I invest £750 for 3 years receiving 5%, 6%, 7% in the 3 years respectively.
How much now

$$£750 \times 1.05 \times 1.06 \times 1.07 = £893.18$$

Harder Examples

1) I invest £4500 for 7 years and find it grows to £6766.34. What was the annual rate of interest

$$4500 \times m^7 = 6766.34$$

$$m^7 = \frac{6766.34}{4500}$$

$$m = \sqrt[7]{\frac{6766.34}{4500}} = \left(\frac{6766.34}{4500}\right)^{\frac{1}{7}}$$

$$m = 1.060000086$$

Rate of interest 6 % per annum

2) A car cost £24000 new. It is worth £8897.76 after 5 years. What is the annual depreciation percentage.

$$24000 \times m^5 = 8897.76$$

$$m^5 = \frac{8897.76}{24000}$$

$$m = \left(\frac{8897.76}{24000}\right)^{\frac{1}{5}} = 0.820000644$$

Depreciation annual rate = 18 %