

Compound Interest

Ex1 Find the amount in the bank when £5000 is invested at 4% per annum for 2 years

$$\begin{array}{r}
 \text{YR1} \quad \begin{array}{r} \pounds 5000 \\ \pounds 200 + \\ \hline \pounds 5200 \\ \pounds 208 + \\ \hline \pounds 5408 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \text{Alternatively} \\
 \pounds 5000 \times 1.04 \times 1.04 \\
 = \pounds 5000 \times 1.04^2 \\
 = \pounds 5408
 \end{array}$$

Ex2 Find the amount in the bank when £800 is invested at 10% per annum for 3 years

$$\begin{array}{r}
 \text{YR1} \quad \begin{array}{r} \pounds 800 \\ \pounds 80 + \\ \hline \pounds 880 \\ \pounds 88 + \\ \hline \pounds 968 \\ 96.80 + \\ \hline \pounds 1064.80 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \text{Alternatively} \\
 \pounds 800 \times 1.10 \times 1.10 \times 1.10 \\
 = \pounds 800 \times 1.10^3 \\
 = \pounds 1064.80
 \end{array}$$

A formula for compound interest

If  $A$  is amount in bank,  $P$  is principal - the amount invested,  $r$  is the annual percentage rate of interest,  $n$  the number of years, then  $A = P \left(1 + \frac{r}{100}\right)^n$

Ex 3 Find the amount in the bank when £2500 is invested at 6% per annum for 7 years.

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

$$\begin{aligned} \text{Amount} &= £2500 \times 1.06^7 \\ &= £3759.08 \end{aligned}$$

Ex 4 Find the amount in the bank when £4000 is invested at 12% per annum for 25 years.

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

$$\begin{aligned} \text{Amount} &= £4000 \times 1.12^{25} \\ &= £68,000.26 \end{aligned}$$

### Depreciation

Ex 5. Find the value of a 2 year old motor cycle if it cost £4000 new and depreciated by 25% per annum

	$£4000$ $£1000 -$ <hr style="width: 50%; margin-left: 0;"/> $£3000$ $£750 -$ <hr style="width: 50%; margin-left: 0;"/> $£2250$		<p style="text-align: center;">Alternatively</p> $£4000 \times 0.75 \times 0.75$ $= £4000 \times 0.75^2$ $= £2250$
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Ex 6 Find the value of a 3 year old car if it cost £9000 new and depreciated by 10% per annum.

	$\begin{array}{r} \pounds 9000 \\ \pounds 900 - \\ \hline \pounds 8100 \\ \pounds 810 - \\ \hline \pounds 7290 \\ \pounds 729 - \\ \hline \pounds 6561 \end{array}$	<p style="text-align: center;">Alternatively</p> $\begin{aligned} & \pounds 9000 \times 0.9 \times 0.9 \times 0.9 \\ & = \pounds 9000 \times 0.9^3 \\ & = \pounds 6561 \end{aligned}$
YR1		
YR2		
YR3		

Formula for depreciation

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

Ex 7 Find the value of a 7 year old factory machine if it cost £145,000 new and depreciated by 15% per annum.

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

$$\begin{aligned} \text{Value} &= \pounds 145,000 \times 0.85^7 \\ &= \pounds 46,484 \end{aligned}$$

Ex 8 Find the value of a 10 year old factory machine if it cost £750,000 new and depreciated by 28% per annum.

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

$$\begin{aligned} \text{Value} &= \pounds 750,000 \times 0.72^{10} \\ &= \pounds 28,079 \end{aligned}$$