



## 28 - Harder Percentages

### Type 1 — Finding the percentage change

1) This is the formula for giving a **change in value** as a **percentage** — **LEARN IT, AND USE IT:**

$$\text{PERCENTAGE 'CHANGE'} = \frac{\text{'CHANGE'}}{\text{ORIGINAL}} \times 100$$

- 2) You end up with a **percentage** rather than an amount.
- 3) Typical questions will ask 'Find the percentage **increase/profit/error**' or 'Calculate the percentage **decrease/loss/discount**', etc.

### Type 2 — Finding the original value

#### EXAMPLE:

A house increases in value by 10.5% to £132 600. Find what it was worth before the rise.

Note: The **new**, not the original value is given.

- 1) An **increase** of 10.5% means £132 600 represents **110.5% of the original** value.
- 2) Divide by 110.5 to find **1%** of the original value.
- 3) Then multiply by 100.

$$\begin{aligned} &+110.5 \left\{ \begin{array}{l} \text{£132 600} = 110.5\% \\ \text{£1200} = 1\% \end{array} \right. \\ &\times 100 \left\{ \begin{array}{l} \text{£120 000} = 100\% \end{array} \right. \end{aligned}$$

If it was a **decrease** of 10.5%, then you'd put '£132 600 = **89.5%**' and divide by 89.5 instead of 110.5.

So the original value was **£120 000**

### Simple Interest

Simple interest means a certain percentage of the **original amount only** is paid at regular intervals (usually once a year). So the amount of interest is **the same every time** it's paid.

#### EXAMPLE:

Regina invests £380 in an account which pays 3% simple interest each year. How much interest will she earn in 4 years?

- 1) Work out the amount of interest earned **in one year**:  
 $3\% = 3 \div 100 = 0.03$   
 $3\% \text{ of } \text{£}380 = 0.03 \times \text{£}380 = \text{£}11.40$
- 2) Multiply by 4 to get the **total interest** for **4 years**:  
 $4 \times \text{£}11.40 = \text{£}45.60$

### Compound Growth and Decay

This topic is simple if you **LEARN THIS FORMULA**. If you don't, it's pretty well impossible:

Amount after n days/hours/years

$$N = N_0 \times (\text{multiplier})^n$$

Number of days/hours/years

Initial amount

Percentage change multiplier

E.g. 5% increase is 1.05 (= 1 + 0.05)

26% decrease is 0.74 (= 1 - 0.26)

#### Linked Prior Topics

Percentage of amounts  
 Percentage increase/decrease  
 Express one number as a percentage of another

#### Vocabulary

Percentage change  
 Simple interest  
 Compound interest  
 Growth/Decay

#### Linked Future Topics

Solving percentage problems.  
 Proportion