Finding Percentage Increase and Decrease

Starter

1. **(Review of last lesson)** A quantity, 60 m, is increased by 12.7%. Find the new value of the quantity.

2.* A quantity, x, is increased by $p\%$. The new value of the quantity is y. Write down an equation involving p, x and y.
   Hint: use the fraction multiplier method or the "find $p\%$ and add it to the original value method"

Notes

We can rearrange the first equation from question 2 of the starter to make p the subject (i.e. get it on its own) and thus find the percentage increase.

$$\frac{x(100+p)}{100} = y$$
$$x(100+p) = 100y \qquad \textit{multiply by 100}$$
$$100x + px = 100y \qquad \textit{expand the brackets}$$
$$px = 100y - 100x \qquad \textit{subtract } 100x$$
$$px = 100(y-x) \qquad \textit{factorise the RHS}$$
$$p = \frac{100(y-x)}{x} \qquad \text{divide by } x$$

In other words:

$$p = \frac{y-x}{x} \times 100 \qquad \text{where } x \text{ is the original amount}$$

y is the new amount

and $y - x$ is the change or difference in price

$$\% \textbf{ change} = \frac{\textbf{Difference}}{\textbf{Original}} \times 100\% \qquad \textbf{"D/O times 100"}$$

N.B. If a value **appreciates**, it means the price **increases**.
If a value **depreciates**, it means the price **decreases**.

E.g. 1 Find the percentage change from: (a) 50 km to 54 km (b) 54 km to 50 km.

Working: (a) $\% \text{ change} = \dfrac{\text{Difference}}{\text{Original}} \times 100\%$
$$= \frac{54-50}{50} \times 100\%$$
$$= 8\%$$

(b) $\% \text{ change} = \dfrac{\text{Difference}}{\text{Original}} \times 100\%$
$$= \frac{54-50}{54} \times 100\%$$
$$= 7.41\%$$

E.g. 2 Over a two year period a house increases in value from £145 000 to £205 000. Find the percentage increase.

E.g. 3 A motorbike depreciated from £4500 to £3200. Find the percentage depreciation.

E.g. 4 The Smiths lounge measures 4 m by 3.5 m. They decide to increase its size by extended the longer sides by 2 m and the shorter sides by 1.5 m. Calculate the percentage increase in the area.

Video: **Finding the percentage change**

Solutions to Starter and E.g.s

Exercise
p162 Ex 9.6 Qu 1-10

Summary

$$\% \text{ change} = \frac{\text{Difference}}{\text{Original}} \times 100\,\%$$

N.B. If a value "appreciates", it means the price goes up
If a value "depreciates", it means the price goes down

Textbook answers (only available during a lockdown)