Mixed Percentages

Starter

1. **(Review of last lesson)** A special packet of sweets contains 80 sweets, which is $27\,\%$ more than a normal packet. How many sweets are in a normal packet?

Working:

	Quantity	Percentage	
Before	$\div 1.27$ x	$100\,\%$	$\times 1.27$
After	80	$127\,\%$	

$$x = \frac{16500}{1.20} = 13750$$

...or...

$x \xrightarrow[\times 1.27]{+27\%} 80$

$$x \times 1.27 = 80$$

$$x = \frac{80}{1.27} = 63 \text{ to the nearest sweet}$$

Comparing proportion tables for percentages questions

E.g. 1 Draw a proportion table for each of these questions.

(a) Increase £58 by $26\,\%$.

(b) Find percentage change when 58 in increased to £73.08.

(c) After a $26\,\%$ increase, the price of an item is now £73.08. Find the price of the item before the increase.

Working: (a)

	Quantity	Percentage	
Before	$\times 1.26$ 58	$100\,\%$	$\times 1.26$
After	x	$126\,\%$	

(b)

	Quantity	Percentage	
Before	$\times m$ 58	$100\,\%$	$\times m$
After	73.08		

(c)

	Quantity	Percentage	
Before	$\div 1.26$ x	$100\,\%$	$\times 1.26$
After	73.08	$127\,\%$	

E.g. 2 Find the percentage reduction when the selling price is reduced from £49 to £31.

Working: Find the percentage increase/decrease

	Quantity	Percentage
Before	49	100 %
After	31	

$\times m$ (Before → After) and $\times m$ (Before → Percentage)

Multiplier $= \dfrac{31}{49} = 0.632 \equiv 63.2\,\%$ (1 d.p.)

The percentage increase is $100\% - 63.2\,\% = 36.7\,\%$

...or...

$\%$ change $= \dfrac{49 - 31}{49} \times 100\,\% = 36.7\,\%$

The percentage reduction is $36.7\,\%$

E.g. 3 In a class there are 17 girls and 13 boys. What percentage of the class are girls?

Working: Express one quantity as a percentage of another

$\dfrac{17}{17 + 13} \times 100\,\% = 56.\dot{6}\,\%$ or $56.7\,\%$ (3 s.f.)

The percentage of girls is $56.\dot{6}\,\%$.

E.g. 4 Increase 375 by $7\,\%$.

Working: Increase/decrease by a percentage

	Quantity	Percentage
Before	375	100 %
After	x	107 %

$\times 1.07$ (Before → After) and $\times 1.07$ (Before → Percentage)

$x = 375 \times 1.07 = 401.25$

...or...

$100\% + 7\,\% = 107\,\% \equiv 1.07$

$1.07 \times 375 = 401.25$

375 increased by $7\,\%$ is 401.25

E.g. 5 My car is now worth £18920. Its value has decreased 14 % since I bought it new. How much did the car cost when it was new?

Working: Reverse percentages
Note the words "was" and "before".

	Quantity	**Percentage**
Before	x	100 %
After	18920	86 %

Quantity: 18920 → x, $\div 0.86$. Percentage: 100 % → 86 %, $\times 0.86$.

$$x = \frac{18920}{0.86} = 22000$$

...or...

x —(−14%, ×0.86)→ **18920**

$$x \times 0.86 = 18920$$
$$x = \frac{18920}{0.86} = 22000$$

My salary before the increase was £22000.

E.g. 6 Find 19 % of 83.

Working: Find a percentage of a quantity
$19\% \equiv 0.19$
19% of $83 = 0.19 \times 83 = 15.77$

Solutions to Starter and E.g.s

Exercise
Y8 Mixed percentages worksheet

Y8 Mixed percentages ANSWERS