Reverse percentages

Starter

1. **(Review of last lesson)** A farmer buys a tractor for £150,000. It depreciates by 25 % in the first year and then by 15 % thereafter. How much will it be worth in 8 years?
N.B. Depreciates means "goes down in value".

Working:
Depreciates by 25 % ⇒ × 0.75
Depreciates by 15 % ⇒ × 0.85
Value after 8 years $= 150000 \times 0.75 \times 0.85^7 = £36064.92$

2. **(Review of previous material)** A fridge is reduced by 12 % in a sale. If the original price is £180 what is the sale price?

Working:
Reduced by 12 % ⇒ × 0.88
Sale price $= 180 \times 0.88 = £158.40$

3. **(Review of previous material)** A fridge is in the sale for £125 after a 12 % reduction. What was the original price of the fridge?

Working: ***This diagram explains the process:*** ***Original price*** $\xrightarrow[\times 0.88]{-12\%}$ **125**

From this we can write a equation:
Original price $\times 0.88 = 125$
$$\text{Original price} = \frac{125}{0.88} = £142.05$$

E.g. 1 After an increase of 8 % , the price of a car is £6696. Find the price of the car before the increase.

Working: Let x be the price of the car before the increase.

$$x \xrightarrow[\times 1.08]{+8\%} 6696 \quad \Rightarrow \quad x \times 1.08 = 6696$$
$$x = \frac{6696}{1.08} = 6200$$

The price of the car before the increase was £6200.

E.g. 2 The number of frogs in a pond has decreased by 15 % this year to 391. How many frogs were there last year?

Working: Let x be the number of frogs last year.

$$x \xrightarrow[\times 0.85]{-15\%} 391 \quad \Rightarrow \quad x \times 0.85 = 391$$
$$x = \frac{391}{0.85} = 460$$

There were 460 frogs last year.

E.g. 3 Since Michael bought his house, the price has gone up by $4\,\%$ and is now worth £6500 ***more***. How much did Michael buy the house for?

Working: Let x be the price of the house when Michael bought it.

$$x \xrightarrow[\times 1.04]{+4\%} x + 6500 \quad \Rightarrow \quad x \times 1.04 = x + 6500$$
$$0.04x = 6500$$
$$x = \frac{6500}{0.04} = 162500$$

Michael bought the house for £162500.

Alternatively: $4\,\%$ represents 6500 i.e. $4\,\% \equiv 6500$

$$1\,\% \equiv \frac{6500}{4}$$
$$100\,\% \equiv \frac{6500}{4} \times 100$$
$$100\,\% \equiv 162500$$

Michael bought the house for £162500.

E.g. 4 The average attendance of a football club fell by $7\,\%$ this year. If 2030 fewer people went to matches this year, how many went last year?

Hint: If x people attended matches last year, write down in terms of x how many attended this year?

Working: $$x \xrightarrow[\times 0.93]{-7\%} x - 2030 \quad \Rightarrow \quad x \times 0.93 = x - 2030$$
$$0.93x + 2030 = x$$
$$2030 = 0.07x$$
$$x = \frac{2030}{0.07} = 29000$$

29000 went to the matches last year.

Alternatively: $7\,\%$ represents 2030 i.e. $7\,\% \equiv 2030$

$$1\,\% \equiv \frac{2030}{7}$$
$$100\,\% \equiv \frac{2030}{7} \times 100$$
$$100\,\% \equiv 29000$$

29000 went to the matches last year.

Video: Reverse percentages

Solutions to Starter and E.g.s

Exercise

9-1 class textbook:	p34 M2.4 Qu 1-16
A*-G class textbook:	p32 M2.4 Qu 1-19
9-1 homework book:	p10 M2.4 Qu 1-11
A*-G homework book:	p8 M2.4 Qu 1-10