## Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

**2.1**

- $y = kx$, and $18 = 4k$ so $k = 4.5$

$$y = 4.5 \times 10 = \mathbf{45}$$

**2.2**

- $y = \dfrac{k}{x}$, and $12 = \dfrac{k}{5}$ so $k = 60$

$$y = \frac{60}{4} = \mathbf{15}$$

**2.3**

- $y = kx^2$, and $45 = 9k$ so $k = 5$

$$y = 5 \times 25 = \mathbf{125}$$

**2.4**

- $y = k\sqrt{x}$, and $12 = k\sqrt{9} = 3k$ so $k = 4$

$$y = 4\sqrt{25} = 4 \times 5 = \mathbf{20}$$

**2.5**

- $y = \dfrac{k}{x}$, so doubling $x$ divides $y$ by 2: $y$ is **halved**

**3.1**

(a)

- $y = \dfrac{k}{x^2}$, and $9 = \dfrac{k}{4}$ so $k = 36$

$$\mathbf{y = \frac{36}{x^2}}$$

(b)

- $y = \dfrac{36}{36}$

$$= \mathbf{1}$$

(c)

- $4 = \dfrac{36}{x^2}$, so $x^2 = 9$

$$x = \mathbf{3}$$

**3.2**

- $T = \dfrac{k}{n}$, and $10 = \dfrac{k}{6}$ so $k = 60$

$$T = \frac{60}{4} = \mathbf{15} \text{ hours}$$

- fewer workers means MORE time, which is the check that the relationship was written as an inverse

**3.3**

- $m = kr^3$, and $40 = k \times 2^3 = 8k$ so $k = 5$

$$m = 5 \times 3^3 = 5 \times 27 = \mathbf{135} \text{ g}$$

**3.4**

- $y = kx^2$; the new $x$ is $1.2x$
- new $y = k(1.2x)^2 = 1.44\,kx^2$, so $y$ is multiplied by 1.44
- percentage increase $= (1.44 - 1) \times 100\% = \mathbf{44}\%$

**3.5**

(a)

- $F = \dfrac{k}{d^2}$, and $50 = \dfrac{k}{4^2} = \dfrac{k}{16}$ so $k = 800$

$$F = \frac{800}{10^2} = \frac{800}{100} = \mathbf{8} \text{ N}$$

(b)

- $2 = \dfrac{800}{d^2}$, so $d^2 = 400$

$$d = \sqrt{400} = \mathbf{20} \text{ cm}$$