

Section 1: Algebra

Chapter 2

Exercise D

3. (i) $\text{Time} = \frac{\text{distance}}{\text{speed}} = \frac{20}{x}$ hours

(ii) Slower speed = $(x-5)$ kmh⁻¹ → longer time = $\frac{20}{(x-5)}$ hours.

(iii) longer time is 20 mins = $\frac{1}{3}$ hour more

$$\rightarrow \frac{20}{(x-5)} - \frac{20}{x} = \frac{1}{3}$$

$$\times 3x(x-5) \rightarrow 3x(x-5) \cdot \frac{20}{(x-5)} - 3x(x-5) \cdot \frac{20}{x} = 3x(x-5) \cdot \frac{1}{3}$$

$$\rightarrow 60x - 60x + 300 = x^2 - 5x$$

$$\rightarrow x^2 - 5x + 300 = 0$$

$$\rightarrow (x-20)(x+15) = 0$$

$$\rightarrow \underline{x = 20} \quad (\text{reject } x = -15 \text{ since } x \text{ is a speed})$$

don't forget to keep time units the same

@ - use the quadratic formula if you can't find the factors

(iv) Journey usually takes $\frac{20}{x} = \underline{\underline{1}}$ hour.