

## Practice Problems

**\*\* Answers have 2 significant digits because data supplied had 2 s.d.**

1. A canoeist travels 5.2 km in 45 min. What was his average speed as measured in: (a) km/h and (b) m/s?

$$\begin{aligned} \text{(a) } V_{\text{ave}} &= \frac{\Delta d}{\Delta t} = \frac{5.2 \text{ km}}{45 \text{ min}} \\ &= 0.1156 \text{ km/min} \times \frac{60 \text{ min}}{1 \text{ h}} \\ &= 6.93 \text{ km/h} \\ \mathbf{V_{\text{ave}} = 6.9 \text{ km/h}} \end{aligned}$$

$$\begin{aligned} \text{(b) } V_{\text{ave}} &= \frac{\Delta d}{\Delta t} = \frac{5.2 \text{ km}}{45 \text{ min}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ min}}{60 \text{ s}} = 1.9 \text{ m/s} \\ \mathbf{V_{\text{ave}} = 1.9 \text{ km/h}} \end{aligned}$$

2. A girl on a long board travels down a 620 m hill in just 49.0 s. What was her average speed in km/h?

$$\begin{aligned} V_{\text{ave}} &= \frac{\Delta d}{\Delta t} = \frac{620 \text{ m}}{49 \text{ s}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{3600 \text{ s}}{1 \text{ h}} = 45.6 \text{ km/h} \\ \mathbf{V_{\text{ave}} = 46 \text{ km/h}} \end{aligned}$$

3. In a race at a time of 8.2 s, a runner was at a position of 89 m. Just 4.0 seconds later, the same runner was at 143 m. What was her average speed in (a) m/s and (b) km/h?

$$V_{\text{ave}} = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{t_f - t_i} = \frac{143 \text{ m} - 89 \text{ m}}{12.2 \text{ s} - 8.2 \text{ s}} = \frac{54 \text{ m}}{4 \text{ s}}$$

$$\text{(a) } 13.5 \text{ m/s} = \mathbf{14 \text{ m/s}}$$

$$\begin{aligned} \text{(b) } \frac{13.5 \text{ m}}{1 \text{ s}} \times \frac{3600 \text{ s}}{1 \text{ h}} \times \frac{1 \text{ km}}{1000 \text{ m}} &= 48.6 \text{ km/h} \\ &= \mathbf{49 \text{ km/h}} \end{aligned}$$