

c) Velocity = slope of position-time graph

$$\text{slope} = 0$$

d) Velocity = slope of position-time graph

$$\begin{aligned}\text{slope} &= \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{(14.0 - 7.0) \text{ m}}{(16.0 - 13.2) \text{ s}} \\ &= 2.5 \text{ m/s north}\end{aligned}$$

$$\begin{aligned}\text{e) } v_{\text{average}} &= \frac{d}{t} \\ &= \frac{14.0 \text{ m}}{16.0 \text{ s}} \\ &= 0.875 \text{ m/s north}\end{aligned}$$

f) Since slope does not change, the velocity does not change.

$$\text{acceleration} = 0$$

4. a) Read the velocity from a velocity-time graph.

$$v = 4.0 \text{ m/s east}$$

b) Read the velocity from a velocity-time graph

$$v = 6.0 \text{ m/s east}$$

c) Read the velocity from a velocity-time graph

$$v = -3.0 \text{ m/s east or } 3.0 \text{ m/s west}$$

d) Acceleration = slope of velocity-time graph

$$\begin{aligned}\text{slope} &= \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{(-6.0 - 6.0) \text{ m/s}}{(12.0 - 8.0) \text{ s}} \\ &= -3.0 \text{ m/s}^2 \text{ or } 3.0 \text{ m/s}^2 \text{ west}\end{aligned}$$

e) Acceleration = slope of velocity-time graph

$$\begin{aligned}\text{slope} &= \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{(0 - (-6.0)) \text{ m/s}}{(20.0 - 14.0) \text{ s}} \\ &= 1.0 \text{ m/s}^2 \text{ east}\end{aligned}$$

f) Displacement = area under velocity-time graph

$$\begin{aligned}\text{area} &= \text{area } \triangle + \text{area } \square + \text{area } \triangle \\ &= \frac{1}{2}(6.0 \times 6.0) + (6.0 \times 2.0) + \frac{1}{2}(6.0 \times 2.0) \\ &= 36.0 \text{ m east}\end{aligned}$$

$$\text{g) } v_{\text{average}} = \frac{d}{t}$$

Find the total displacement

- the displacement during the first 10.0 s = 36 m

Find the displacement during the last 10.0 s

Displacement = area

$$\begin{aligned}\text{area} &= \text{area } \triangle + \text{area } \square + \text{area } \triangle \\ &= \frac{1}{2}(-6.0 \times 6.0) + (-6.0 \times 2.0) + \frac{1}{2}(-6.0 \times 2.0) \\ &= -36.0 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Total displacement} &= 36.0 \text{ m} - 36.0 \text{ m} \\ &= 0\end{aligned}$$

$$\text{Velocity} = 0$$

5. a) Velocity = slope of position-time graph

$$\begin{aligned}\text{slope} &= \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{(-16.0 - 16.0) \text{ m}}{(8.0 - 0) \text{ s}} \\ &= -4.0 \text{ m/s or } 4.0 \text{ m/s south}\end{aligned}$$

b) same slope as a)
= -4.0 m/s or 4.0 m/s south

c) Acceleration = 0 because velocity does not change.

6.a) Read the velocity from a velocity-time graph

$$v = 15.0 \text{ m/s north}$$

b) Acceleration = slope of a velocity-time graph

$$\begin{aligned}\text{slope} &= \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} \\ &= 0\end{aligned}$$