

## Speed and Velocity Answers

a)  $v_{\text{avg}} = ?$   
 $\Delta d = 88 \text{ m}$   
 $\Delta t = 14 \text{ s}$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

$$= \frac{88 \text{ m}}{14 \text{ s}}$$

$$= 6.3 \text{ m/s}$$

$\therefore$  the average speed was  $6.3 \text{ m/s}$ .

b)  $v_{\text{avg}} = ?$   
 $\Delta d = 425 \text{ km}$   
 $\Delta t = 4.65 \text{ h}$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

$$= \frac{425 \text{ km}}{4.65 \text{ h}}$$

$$= \frac{425000 \text{ m}}{4.65 \times 3600 \text{ s}}$$

$$= \frac{425000 \text{ m}}{16740 \text{ s}}$$

$$= 25.4 \text{ m/s} \quad \text{OR} \quad 91.4 \text{ km/h}$$

$\therefore$  the average speed was  $91.4 \text{ km/h}$  or  $25.4 \text{ m/s}$ .

c)  $v_{\text{avg}} = ?$   
 $\Delta d = 120 \text{ m} + 440 \text{ m}$   
 $= 560 \text{ m}$   
 $\Delta t = 18 \text{ s} + 55 \text{ s}$   
 $= 73 \text{ s}$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

$$= \frac{560 \text{ m}}{73 \text{ s}}$$

$$= 7.7 \text{ m/s}$$

$\therefore$  the average speed was  $7.7 \text{ m/s}$ .

2a)  $\vec{v}_{\text{avg}} = ?$   
 $\Delta \vec{d} = 50.0 \text{ m [forward]}$   
 $\Delta t = 16.9 \text{ s}$

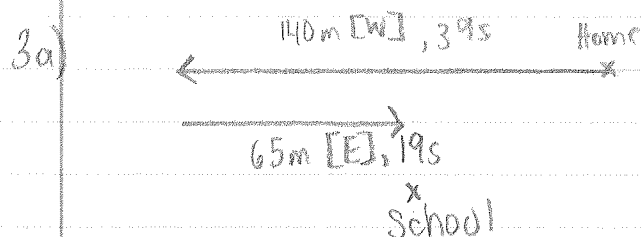
$$\vec{v}_{\text{avg}} = \frac{\Delta \vec{d}}{\Delta t}$$

$$= \frac{50.0 \text{ m [forward]}}{16.9 \text{ s}}$$

$$= 2.96 \text{ m/s [forward]}$$

b)  $2.96 \text{ m/s} = \frac{2.96 \div 1000 \text{ km}}{1 \div 3600 \text{ h}} = \frac{0.00296 \text{ km}}{0.00278 \text{ h}} = 10.656 \text{ km/h}$   
 $= 10.6 \text{ km/h [forward]}$   
 $\therefore 2.96 \text{ m/s [forward]} \text{ is } 10.6 \text{ km/h [forward]}$

## Speed and Velocity Answers



$\therefore$  school is  $140\text{m} - 65\text{m} = 75\text{m [W]}$  of home

b)  $v_{\text{avg}} = ?$

$$\Delta d = 140\text{m} + 65\text{m}$$

$$= 205\text{m}$$

$$\Delta t = 39\text{s} + 19\text{s}$$

$$= 58\text{s}$$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

$$= \frac{205\text{m}}{58\text{s}}$$

$$= 3.5\text{m/s}$$

$\therefore$  average speed is  $3.5\text{m/s}$

c)  $\vec{v}_{\text{avg}} = ?$

$$\Delta \vec{d} = 75\text{m [W]}$$

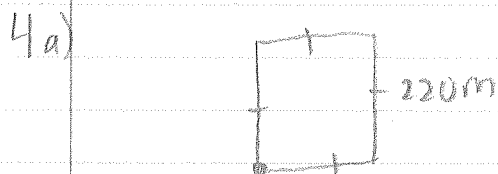
$$\Delta t = 58\text{s}$$

$$\vec{v}_{\text{avg}} = \frac{\Delta \vec{d}}{\Delta t}$$

$$= \frac{75\text{m [W]}}{58\text{s}}$$

$$= 1.3\text{m/s [W]}$$

d)  $\Delta d \neq \Delta \vec{d}$



b)  $v_{\text{avg}} = ?$

$$\Delta d = 4 \times 220\text{m}$$

$$= 880\text{m}$$

$$\Delta t = 3.5\text{min}$$

$$= 210\text{s}$$

$$v_{\text{avg}} = \frac{\Delta d}{\Delta t}$$

$$= \frac{880\text{m}}{210\text{s}}$$

$$= 4.19\text{m/s}$$

$\therefore$  the jogger has an average speed of  $4.19\text{m/s}$

## Speed and Velocity Answers

$$4c) \vec{v}_{avg} = ?$$

$$\Delta \vec{d} = 0 \text{ m}$$

$$\Delta t = 210 \text{ s}$$

$$\begin{aligned} \vec{v}_{avg} &= \frac{\Delta \vec{d}}{\Delta t} \\ &= \frac{0 \text{ m}}{210 \text{ s}} \\ &= 0 \text{ m/s} \end{aligned}$$

$\therefore$  the jogger has an average velocity of 0 m/s upon returning to the starting position.