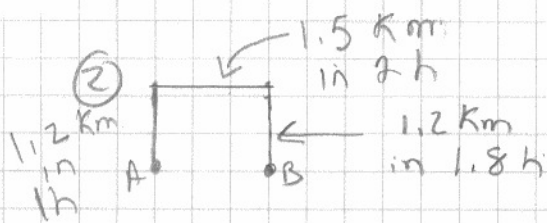


Displacement + answer key

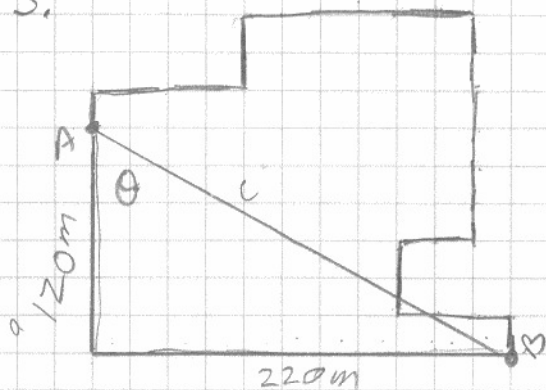
① $8 \text{ km [N]} + 10 \text{ km [N]} = 18 \text{ km [N]}$



a) $v = \frac{d}{t} = \frac{3.9 \text{ km}}{4.8 \text{ h}} = 0.81 \text{ km/h}$

b) $\vec{v}_{\text{avg}} = \frac{\vec{d}}{t} = \frac{1.5}{4.8} = 0.31 \text{ km/h [E]}$

3.



Total distance 540 m

a) $a^2 + b^2 = c^2$

$c = \sqrt{a^2 + b^2}$

$d = \sqrt{120^2 + 220^2}$

$d = \sqrt{62800} = 250.60 \text{ m}$

$\frac{5 \text{ min}}{1} \times \frac{60 \text{ sec}}{1 \text{ min}} = 300 \text{ s}$

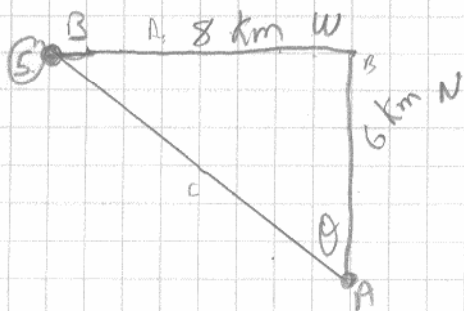
$\theta = \tan^{-1}\left(\frac{\text{opp}}{\text{adj}}\right) = \tan^{-1}\left(\frac{220}{120}\right) = 61.39^\circ$

$d = 250.6 \text{ m } 61.39^\circ \text{ S of East}$

b) $v = \frac{d_{\text{tot}}}{t_{\text{tot}}} = \frac{540 \text{ m}}{300 \text{ s}} = 1.8 \text{ m/s}$

c) $v_{\text{avg}} = \frac{\vec{d}}{t} = \frac{250.6 \text{ m}}{300 \text{ s}} = 0.835 \text{ m/s } (61.39^\circ \text{ South of East})$

④ Alan runs completely around the track his $\vec{d} = 0$, while that of Alex: $\vec{d} > 0$



$c = \sqrt{a^2 + b^2}$

$c = \sqrt{64 + 36}$

$c = \sqrt{100}$

$c = 10 \text{ km}$

$\tan^{-1}\left(\frac{8}{6}\right) = 53^\circ \text{ W of N}$

$\vec{d} = 10 \text{ km } 53^\circ \text{ W of N}$