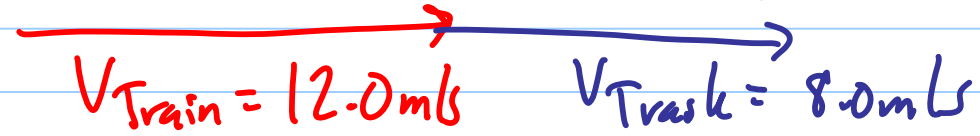
Pre-Test Solutions

Note Title 20/11/2009

1.)

a. $V_{Total} = 20.0\ m/s$

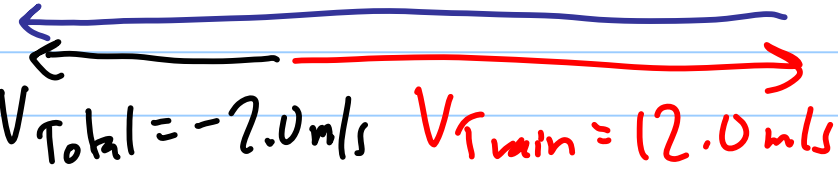


$20.0 m/s\ E$

b. $V_{Total} = 8.0 m/s$ $V_{Trash} = -4.0 m/s$

$8.0\ m/s\ E$

c. $V_{Trash} = -14.0 m/s$

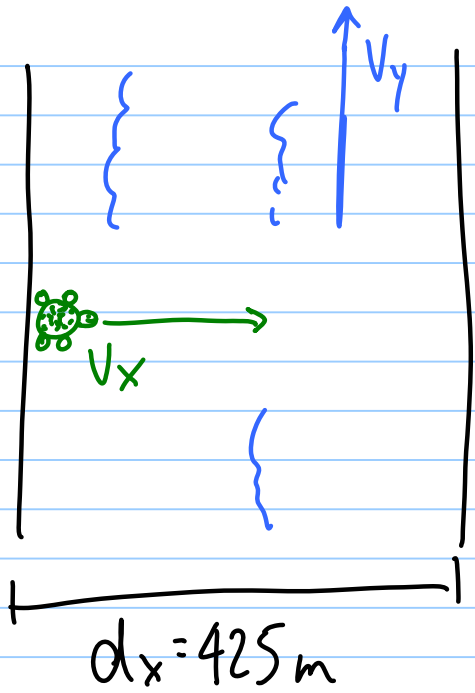


$2.0\ m/s\ W$

or

$-2.0\ m/s$

2.)



a. $V_x = \frac{d_x}{t}$

$t = \frac{d_x}{V_x}$

$= \frac{425m}{8.0m/s} = 53.13$

$= \boxed{53\,s}$

b. $V_y = \frac{d_y}{t}$

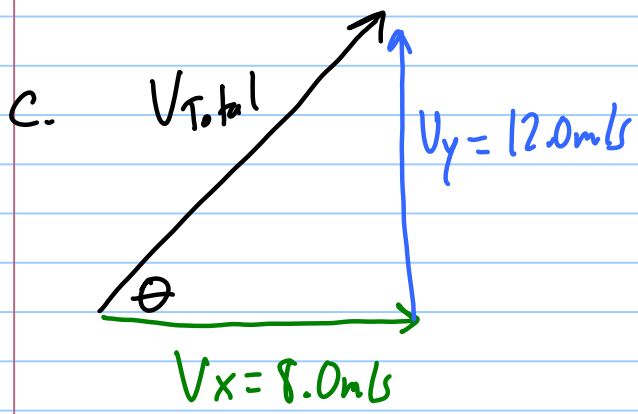
$d_y = V_y \cdot t$

$= (12.0\,m/s)(53.13\,s)$

$= 637.5$

$= \boxed{640\,m}$

c.



$V_{Total}^2 = V_x^2 + V_y^2$

$V_{Total} = \sqrt{V_x^2 + V_y^2}$

$= \sqrt{(8.0)^2 + (12.0)^2}$

$= 14.42\,m/s$

$\tan\theta = \frac{V_y}{V_x}$

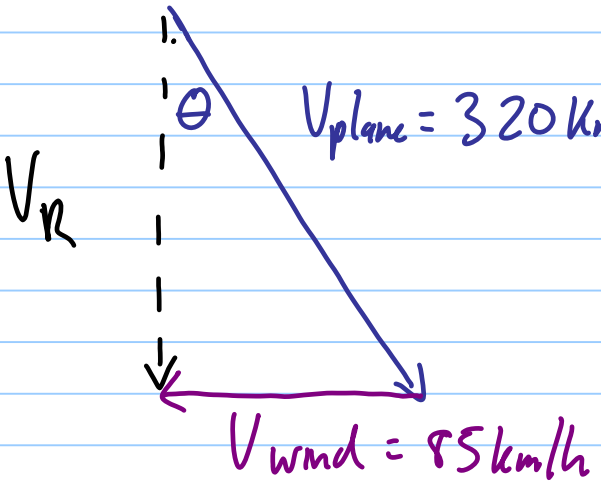
$\theta = \tan^{-1}\left(\frac{V_y}{V_x}\right)$

$= \tan^{-1}\left(\frac{12.0}{8.0}\right)$

$= 56°$

$\boxed{14\,m/s \;\; 56° \; N\,of\,E}$

3.) a



$$\sin\theta = \frac{V_{wind}}{V_{plane}}$$

$$\theta = \sin^{-1}\left(\frac{85}{320}\right)$$

$$= 15.4°$$

$$= \boxed{15° \text{ E of S}}$$

b.

$$V_{plane}^2 = V_R^2 + V_{wind}^2$$

$$V_R^2 = V_{plane}^2 - V_{wind}^2$$

$$V_R = \sqrt{V_{plane}^2 - V_{wind}^2}$$

$$= \sqrt{(320)^2 - (85)^2}$$

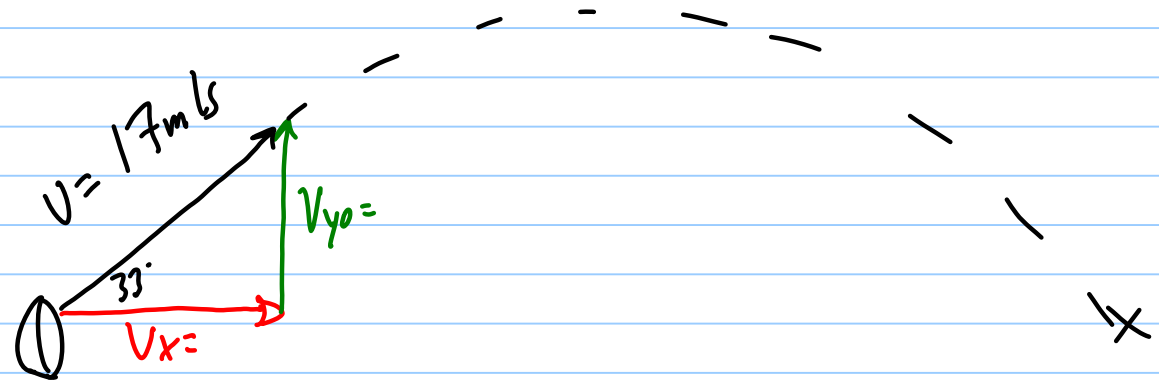
$$= 308.5\ km/h$$

$$v = \frac{d}{t}$$

$$t = \frac{d}{v} = \frac{1200\ km}{308.5\ km/h}$$

$$= \boxed{3.9\ hr}$$

4)



a. $\cos 33 = \frac{V_x}{17}$ $\quad \sin 33 = \frac{V_{yo}}{17}$

$V_x = 17 \cdot \cos 33$ $\quad V_{yo} = 17 \sin 33$

$= 14.26$ $\quad = 9.26 \text{ m/s}$

$= \boxed{14 \text{ m/s}}$ $\quad = \boxed{9.3 \text{ m/s}}$

x	y @ $t_{\frac{1}{2}}$
$V_x = 14.26$	$V_y = 0$
$d_x = ?$	$V_{yo} = 9.26$
$t = 1.89$	$a_y = -9.80$
	$d_y =$
	$t_{\frac{1}{2}} =$

c). $d_x = V_x \cdot t$

$= \boxed{27 \text{ m}}$

b.) $V_y = V_{yo} + a_y t_{\frac{1}{2}}$ ($V_y = 0$)

$t_{\frac{1}{2}} = \frac{-V_{yo}}{a} = \frac{-9.26}{-9.80}$

$= 0.945 \text{ s}$

$t_{total} = t_{\frac{1}{2}} \times 2 = 1.89$

$= \boxed{1.9 \text{ s}}$