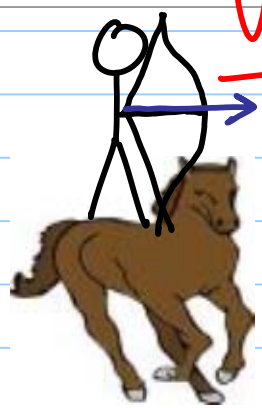
Note Title 04/11/2009

1) a.



$V_{arrow} = 80 m/s$

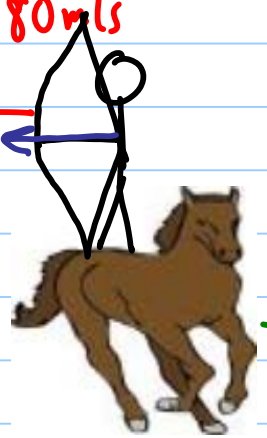
$V_{horse} = 60 m/s$

N

80 m/s 60 m/s

$V_R = 140 m/s$ N

b.



$V_{arrow} = 80 m/s$

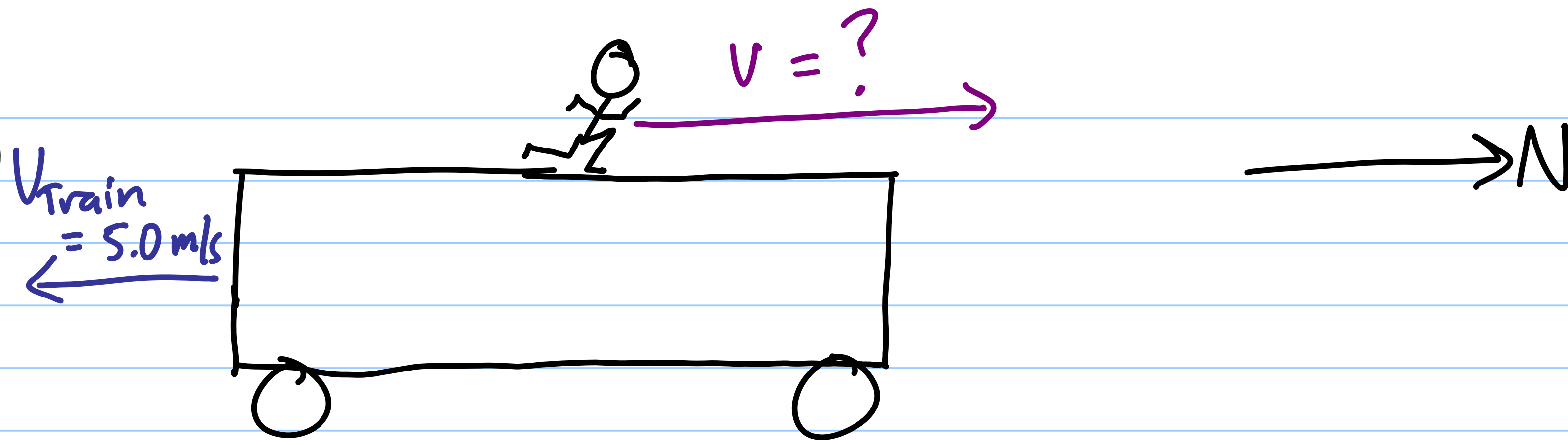
$V_{horse} = 60. m/s$

$V_R = -20 m/s$ or $20 m/s$ S

60 m/s

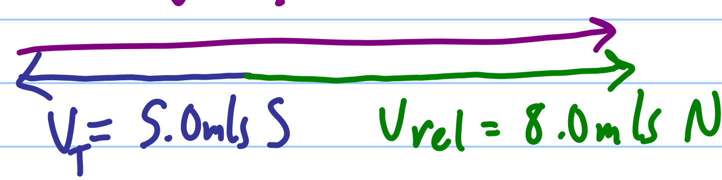
-80 m/s

2)

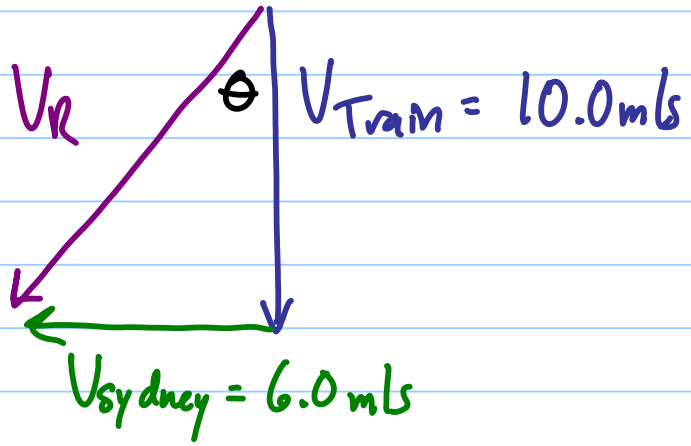


$V_{relative}$ = 8.0 m/s

V = ? = 13 m/s N



3)



$$\tan\theta = \frac{6.0}{10.0}$$

$$\theta = \tan^{-1}\left(\frac{6.0}{10.0}\right)$$

$$= 31°$$

$$V_R^2 = V_T^2 + V_S^2$$

$$V_R = \sqrt{V_T^2 + V_S^2}$$

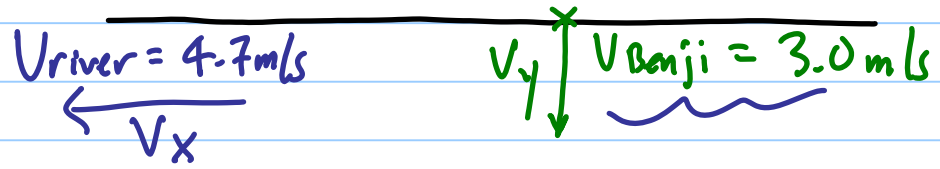
$$V_R = \sqrt{(10.0)^2 + (6.0)^2}$$

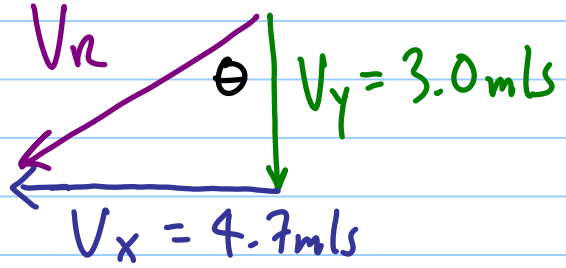
$$= 11.66$$

$$= 12 \text{ m/s}$$

12 m/s 31° W of S

4)





$$V_R^2 = V_x^2 + V_y^2$$

$$V_R = \sqrt{V_x^2 + V_y^2}$$

$$= \sqrt{(4.7)^2 + (3.0)^2}$$

$$= 5.576$$

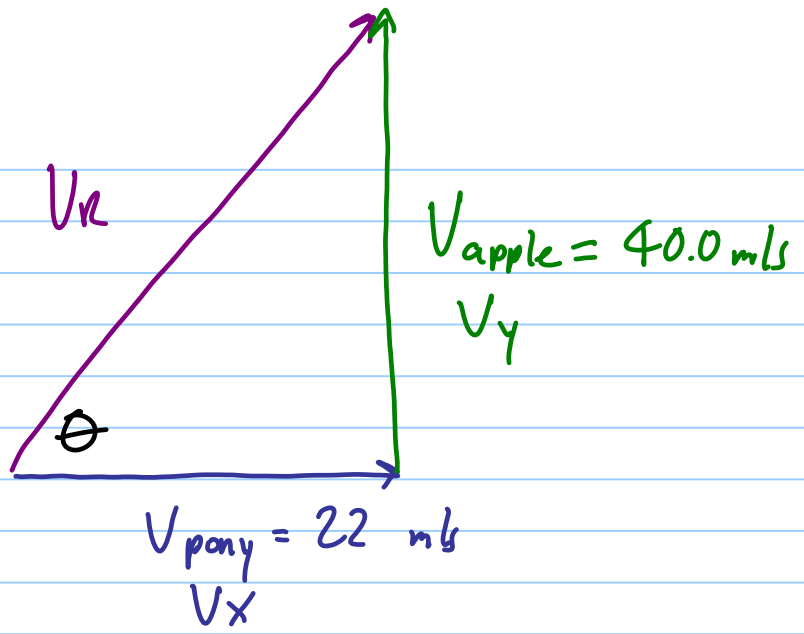
$$= 5.6 \text{ m/s}$$

$$\tan\theta = \left(\frac{4.7}{3.0}\right)$$

$$\theta = \tan^{-1}\left(\frac{4.7}{3.0}\right) = 57^\circ$$

5.6 m/s 57° W of S

5)



$$V_R^2 = V_x^2 + V_y^2$$

$$V_R = \sqrt{V_x^2 + V_y^2} = \sqrt{(22.0)^2 + (40)^2}$$

$$= 45.65$$

$$= 46 \text{ m/s}$$

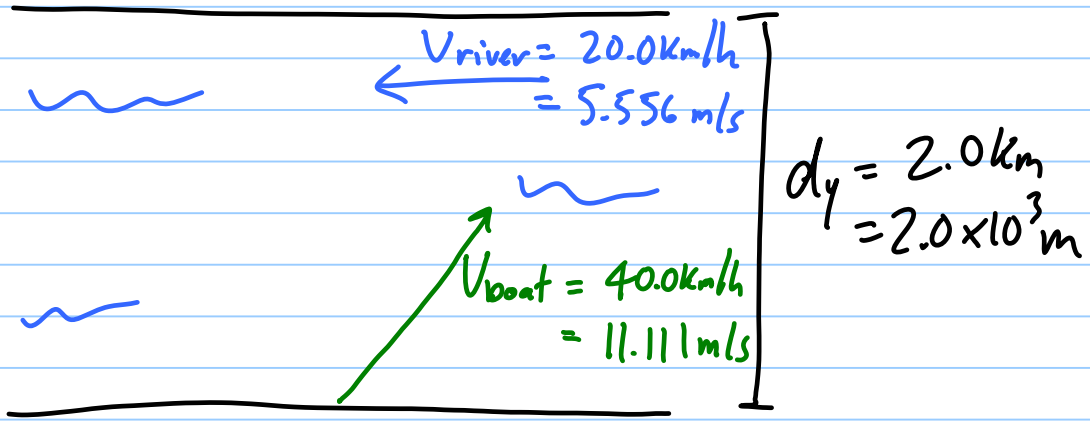
$$\tan\theta = \frac{40.0}{22}$$

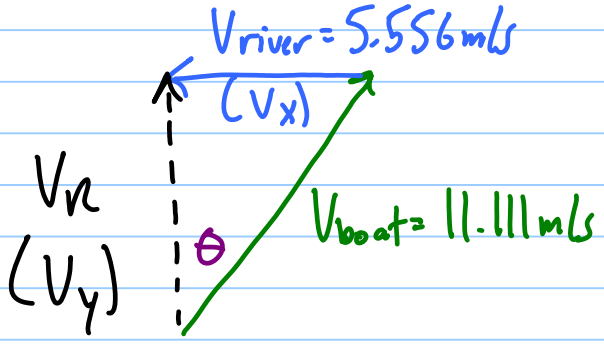
$$\theta = \tan^{-1}\left(\frac{40.0}{22}\right)$$

$$= 61^\circ$$

46 m/s 61° NofE

6)





$$\sin\theta = \frac{v_{river}}{v_{boat}} = \frac{5.556}{11.111}$$

$$\theta = \sin^{-1}\left(\frac{5.556}{11.111}\right)$$

$$= \boxed{30^\circ \text{ E of N}}$$

$$v_{boat}^2 = v_{river}^2 + v_R^2$$

$$v_R = \sqrt{v_{boat}^2 - v_{river}^2}$$

$$= \sqrt{(11.111)^2 - (5.556)^2}$$

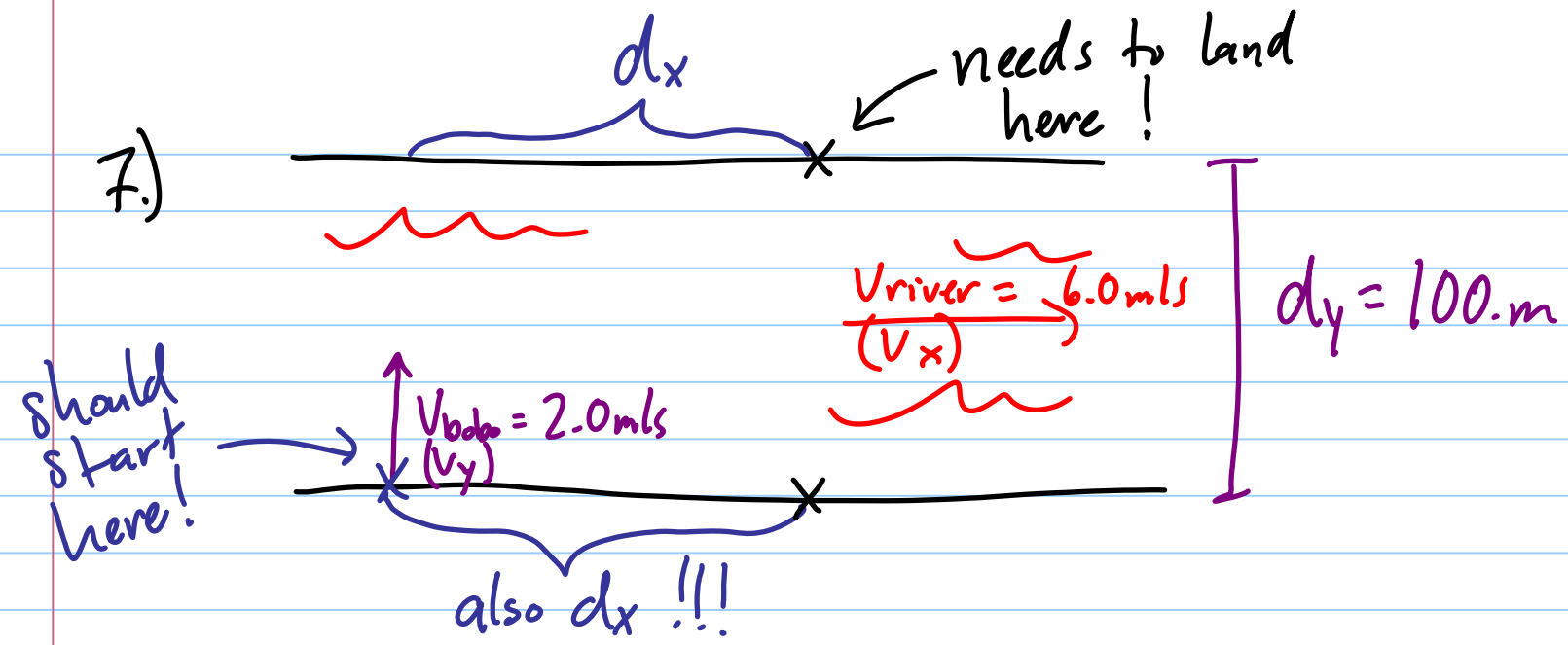
$$= 9.622 \text{ m/s}$$

$$v_y = \frac{d_y}{t}$$

$$t = \frac{d_y}{v_y} = \frac{2.0 \times 10^3 \text{ m}}{9.622 \text{ m/s}}$$

$$= \boxed{210 \text{ s}}$$

7.)



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

don't know this... use the y-direction

$$d_x = v_x \cdot t$$

$$v_y = \frac{d_y}{t}$$

$$t = \frac{d_y}{v_y} = \frac{100.\ m}{2.0\ m/s}$$

$$= 50.\ s$$

since t is the same for both directions

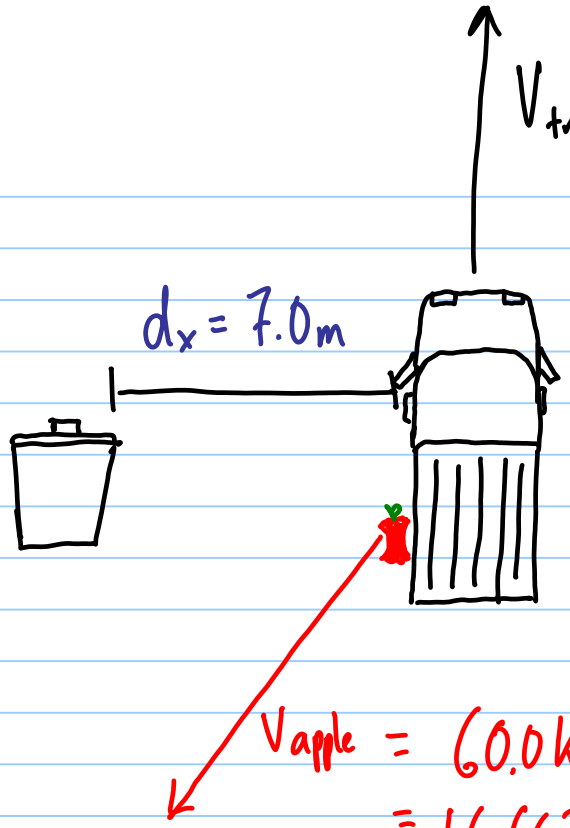
$$d_x = v_x\, t$$

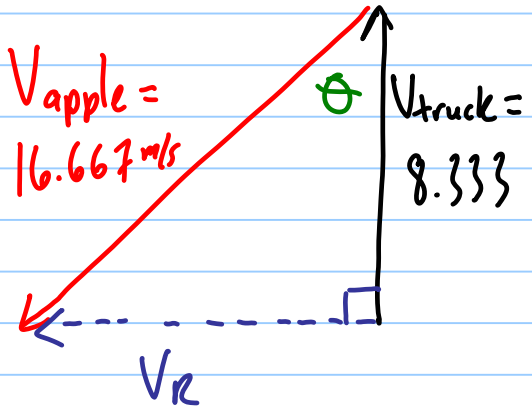
$$= (6.0\ m/s)(50.\ s)$$

$$= 300\ m$$

$$= \boxed{3.0 \times 10^2\ m}$$

8)





$$\cos\theta = \frac{V_{truck}}{V_{apple}}$$

$$\theta = \cos^{-1}\left(\frac{8.333}{16.667}\right)$$

$$= \boxed{60^\circ \text{ W of S}}$$

$$V_{apple}^2 = V_R^2 + V_{truck}^2$$

$$V_R = \sqrt{V_{apple}^2 - V_{truck}^2}$$

$$= 14.43\ m/s$$

$$V_x = \frac{d_x}{t} \qquad t = \frac{d_x}{V_x} = \frac{7.0m}{14.43 m/s} = \boxed{0.49\ s}$$