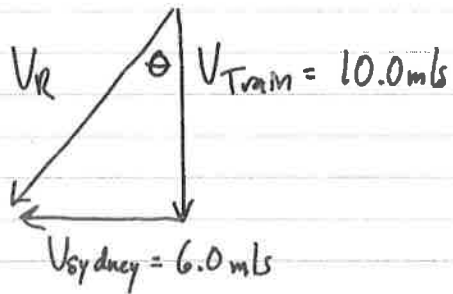


3)



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

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

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

$$= 11.66$$

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

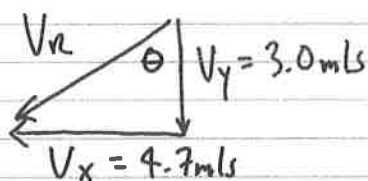
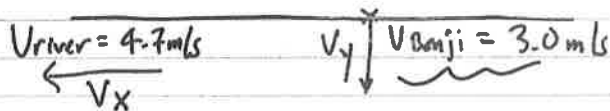
$$\tan \theta = \frac{6.0}{10.0}$$

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

$$= 31^\circ$$

12 m/s 31° W of S

4)



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

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

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

$$= 5.576$$

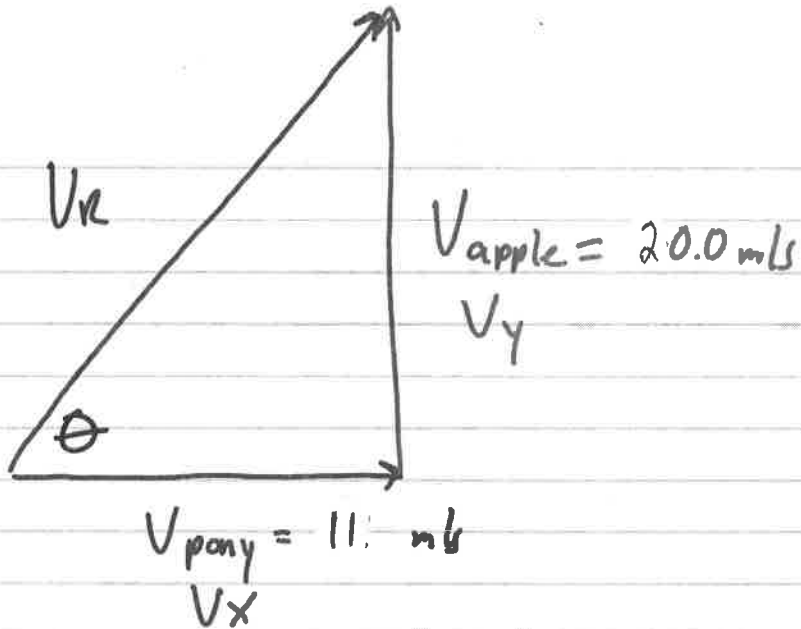
$$= 5.6 \text{ m/s}$$

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

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

5.6 m/s 57° W of S

5)



$$V_r^2 = V_x^2 + V_y^2$$

$$V_r = \sqrt{V_x^2 + V_y^2} = \sqrt{(11)^2 + (20.0)^2}$$

$$= 22.925$$

$$= 23 \text{ m/s}$$

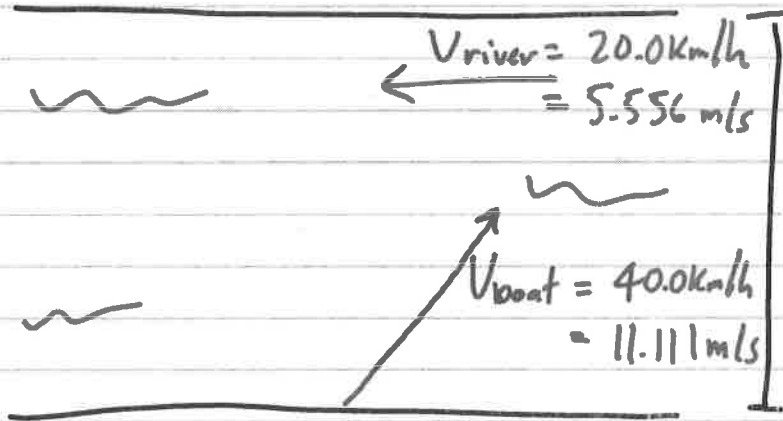
$$\tan \theta = \frac{20.0}{11}$$

$$\theta = \tan^{-1}\left(\frac{20}{11}\right)$$

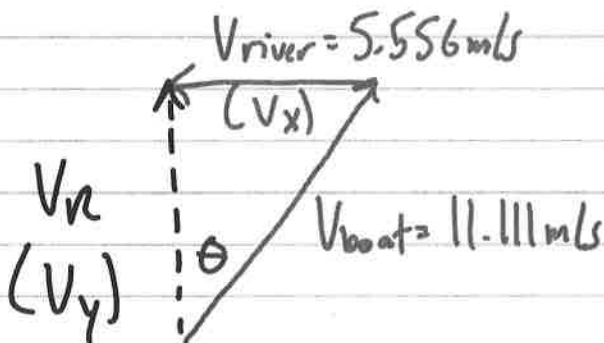
$$= 61.189$$

23 m/s 61 No of E

6.)



$$dy = 2.0 \text{ km} \\ = 2.0 \times 10^3 \text{ m}$$



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

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

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

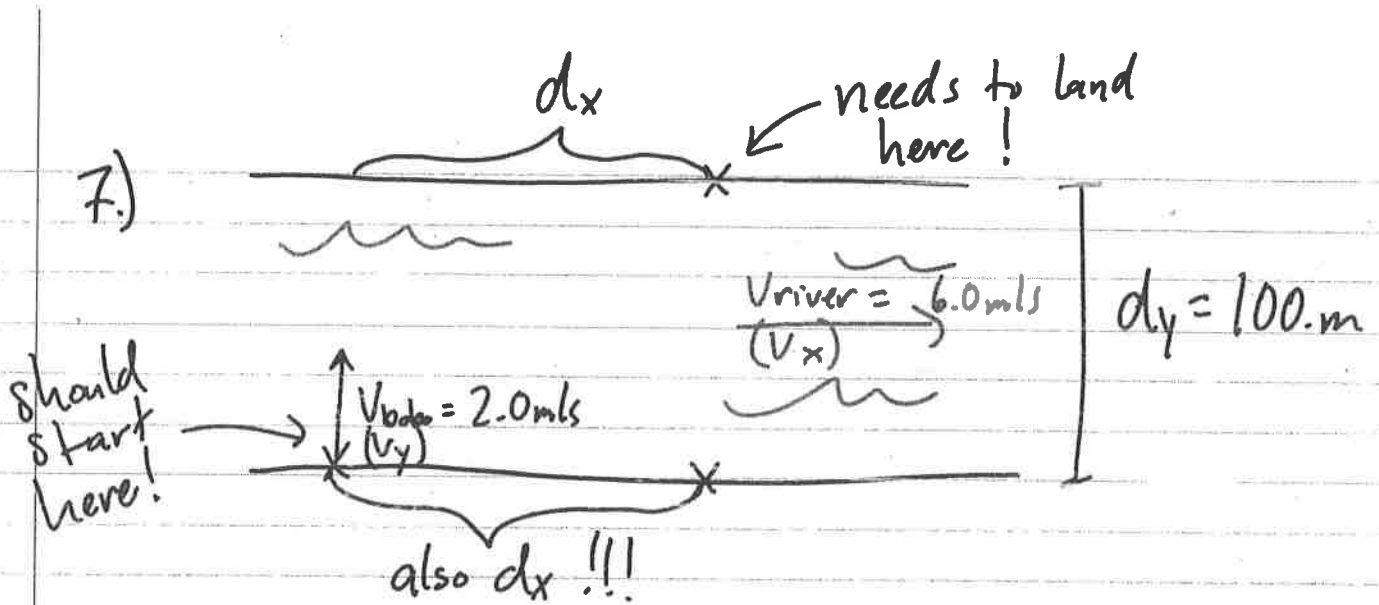
$$V_{\text{boat}}^2 = V_{\text{river}}^2 + V_r^2$$

$$V_r = \sqrt{V_{\text{boat}}^2 - V_{\text{river}}^2} \\ = \sqrt{(11.111)^2 - (5.556)^2} \\ = 9.622 \text{ m/s}$$

$$V_y = \frac{dy}{t}$$

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

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



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

$$d_x = V_x \cdot t$$

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

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

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

$$d_x = V_x t$$

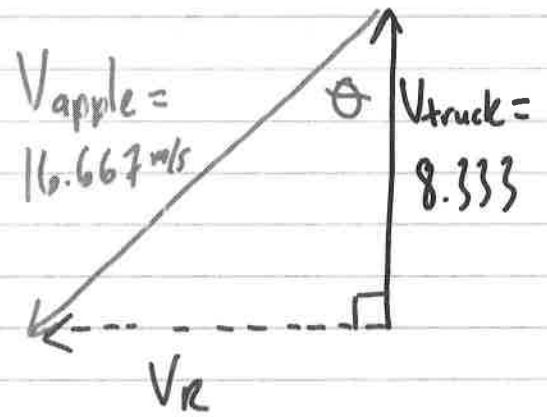
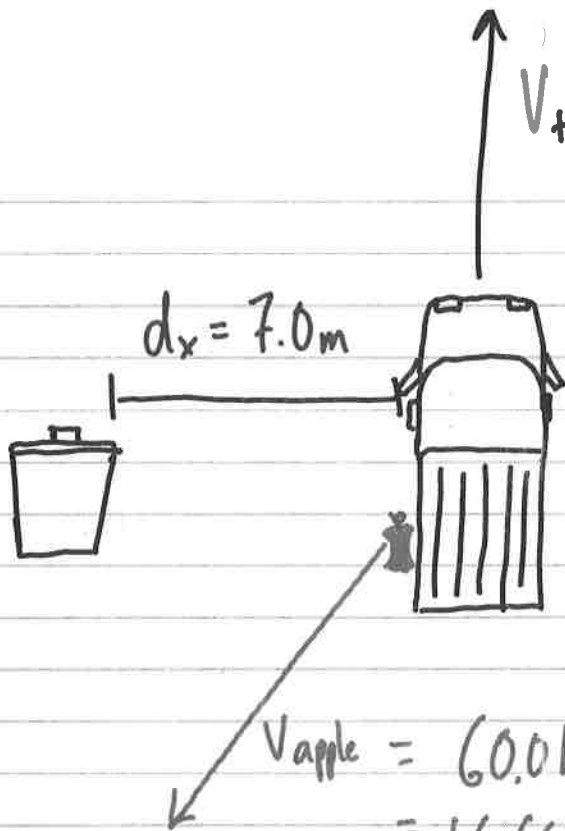
$$= (6.0 \text{ m/s})(50. \text{ s})$$

$$= 300 \text{ m}$$

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

since  $t = 50. \text{ s}$   
is the same  
for both directions

8)



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

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

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

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

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

$$= 14.43 \text{ m/s}$$

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