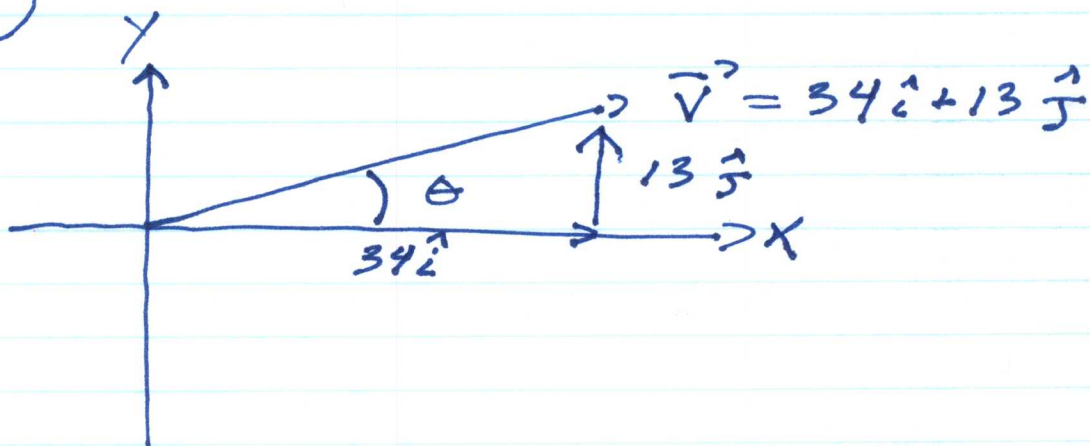


Phys 4A: CHAPTER 3, # 12, 28, 48

# 12

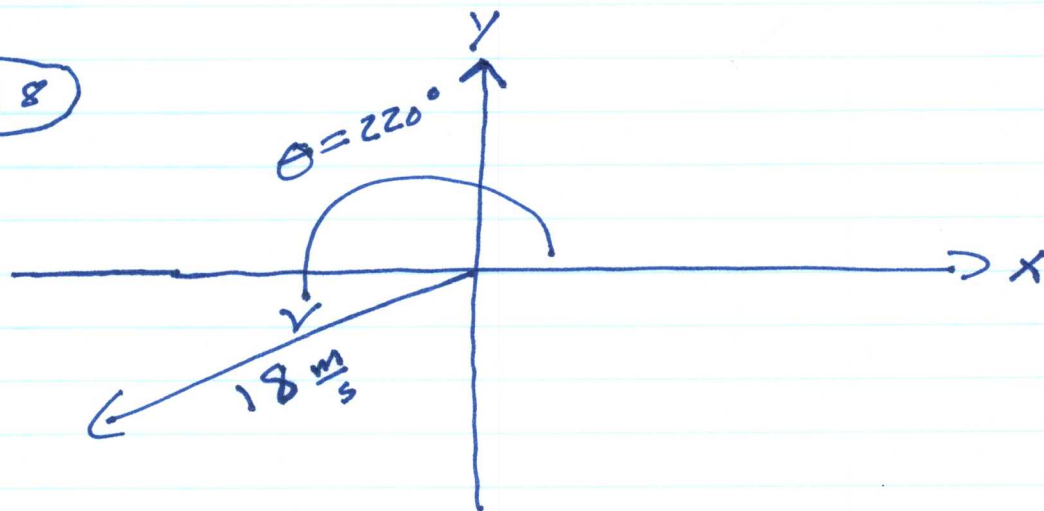


$$|\vec{v}| = \sqrt{34^2 + 13^2} = 36.4$$

$$\tan \theta = \frac{13}{34} = \frac{.382}{.365} \cdot 382$$

$$\theta = \tan^{-1} \left( \frac{.382}{.365} \right) = 29.2^\circ$$

# 28

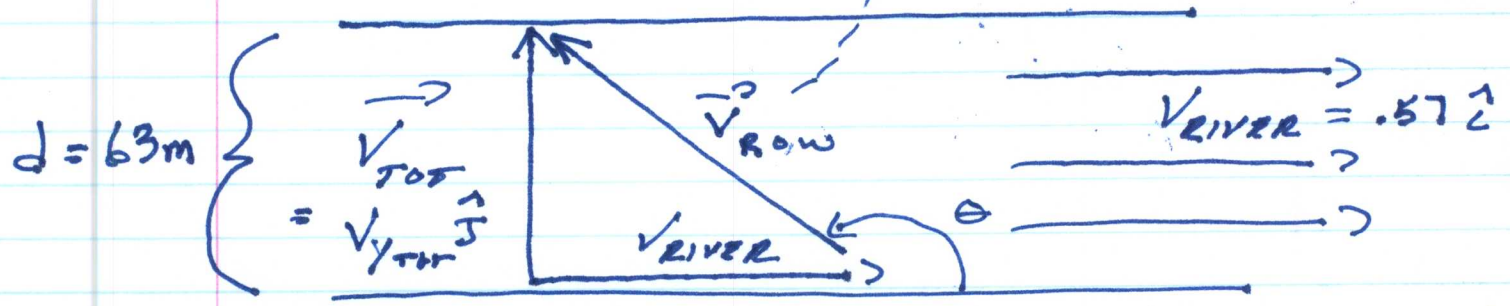


$$V_x = |\vec{v}| \cos 220^\circ = 18 \cos 220^\circ = -13.8 \frac{m}{s}$$

$$V_y = |\vec{v}| \sin 220^\circ = 18 \sin 220^\circ = -11.6 \frac{m}{s}$$

#48

$$V_{ROW} = V_{XROW} \hat{i} + V_{YROW} \hat{j} = 1.3 \cos \theta \hat{i} + 1.3 \sin \theta \hat{j}$$



$$\vec{V}_{TOT} = \vec{V}_{RIVER} + \vec{V}_{ROW}$$

$$\Rightarrow \vec{V}_{TOT} = 0 \hat{i} + V_{YTOT} \hat{j}$$

$$1.3 \sin \theta = .57 + 0$$

$$1.3 \cos \theta = V_{XROW} + V_{YROW}$$

Equating  $\hat{i}$  and  $\hat{j}$  components:

$$\hat{i}: 0 \hat{i} = .57 \hat{i} + 1.3 \cos \theta \hat{i}$$

$$\Rightarrow \cos \theta = \frac{-.57}{1.3} \Rightarrow \theta = \cos^{-1} \left( \frac{-.57}{1.3} \right)$$

$\Rightarrow \theta = 116^\circ$

RELATIVE TO DOWNSTREAM

$$\hat{j}: V_{YTOT} = 0 \hat{j} + 1.3 \sin \theta$$

$$= 1.3 \sin(118^\circ) = 1.147$$

#48 (CONT.)

$$\textcircled{b} \quad t = \frac{\text{DISTANCE ACROSS RIVER}}{v_{\text{TOT}}}$$

$$\Rightarrow t = \frac{63 \text{ m}}{1.147 \frac{\text{m}}{\text{s}}} = 92.8 \text{ s}$$