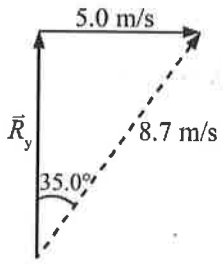
13.



$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

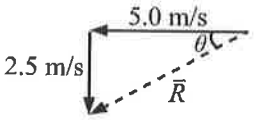
$$\text{adjacent} = \frac{\text{opposite}}{\tan\theta}$$

$$R_y = \frac{R_x}{\tan\theta}$$

$$R_y = \frac{5.0 \text{ m/s}}{\tan 35.0°}$$

$$= 7.1 \text{ m/s}$$

14.



$$R = \sqrt{(v_1)^2 + (v_2)^2}$$

$$= \sqrt{(5.0 \text{ m/s})^2 + (2.5 \text{ m/s})^2}$$

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

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$= \frac{2.5 \text{ m/s}}{5.0 \text{ m/s}}$$

$$\theta = \tan^{-1}\left(\frac{2.5 \text{ m/s}}{5.0 \text{ m/s}}\right)$$

$$= 27°$$

$\vec{R} = 5.6$ m/s 27° S of W

15. Only the velocity that is directed across the current of the river will act to move the boat across the river.

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

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

$$= \frac{2\ 395 \text{ m}}{5.0 \text{ m/s}}$$

$$= 4.8\times10^2 \text{ s}$$

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

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

$$= \frac{2\ 395 \text{ m}}{5.0 \text{ m/s}}$$

$$= 4.79\times10^2 \text{ s}$$

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

$$d = vt$$

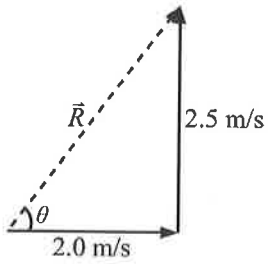
$$= (2.5 \text{ m/s})(4.79\times10^2 \text{ s})$$

$$= 1.2\times10^3 \text{ m}$$

17. 2.5 m/s east + 2.0 m/s east = 4.5 m/s east

18. 2.5 m/s west + 2.0 m/s east = 0.5 m/s west

19.



$$R = \sqrt{(v_1)^2 + (v_2)^2}$$

$$= \sqrt{(2.0 \text{ m/s})^2 + (2.5 \text{ m/s})^2}$$

$$= 3.2 \text{ m/s}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{R_y}{R_x}$$

$$= \frac{2.5 \text{ m/s}}{2.0 \text{ m/s}}$$

$$\theta = \tan^{-1}\left(\frac{2.5 \text{ m/s}}{2.0 \text{ m/s}}\right)$$

$$= 51°$$

$\vec{R} = 3.2$ m/s 51° N of E

20. Consider north and east as the positive directions.

$\vec{R}_1 = \vec{R}_{1x} = 2.0$ m/s

$R_{1y} = 0$