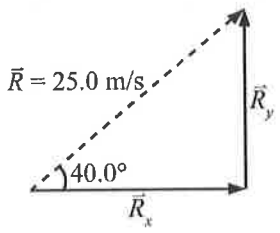
6.



Find the x-component.

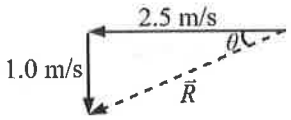
$$\cos\theta = \frac{R_x}{R}$$
$$R_x = R\cos\theta$$
$$= (25.0 \text{ m/s})(\cos 40.0°)$$
$$= 19.2 \text{ m/s}$$

$\vec{R}_x = 19.2$ m/s or 19.2 m/s in the direction of motion

7. 2.5 m/s south + 1.0 m/s south = 3.5 m/s south

8. 2.5 m/s north + 1.0 m/s south = 1.5 m/s north

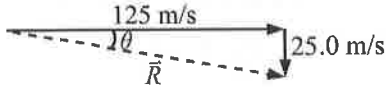
9.



$$R = \sqrt{(v_1)^2 + (v_2)^2}$$
$$= \sqrt{(2.5 \text{ m/s})^2 + (1.0 \text{ m/s})^2}$$
$$= 2.7 \text{ m/s}$$
$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$
$$= \frac{1.0 \text{ m/s}}{2.5 \text{ m/s}}$$
$$\theta = \tan^{-1}\left(\frac{1.0 \text{ m/s}}{2.5 \text{ m/s}}\right)$$
$$= 22°$$

$\vec{R} = 2.7$ m/s 22° S of W

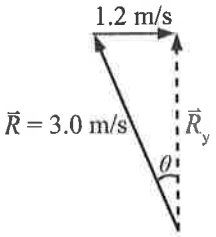
10.



$$R = \sqrt{(v_1)^2 + (v_2)^2}$$
$$= \sqrt{(125 \text{ m/s})^2 + (25.0 \text{ m/s})^2}$$
$$= 127 \text{ m/s}$$
$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$
$$= \frac{25.0 \text{ m/s}}{125 \text{ m/s}}$$
$$\theta = \tan^{-1}\left(\frac{25.0 \text{ m/s}}{125 \text{ m/s}}\right)$$
$$= 11.3°$$

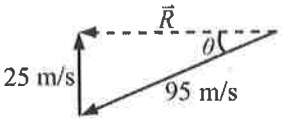
$\vec{R} = 127$ m/s 11.3° S of E

11.



$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$
$$= \frac{R_x}{R}$$
$$= \frac{1.2 \text{ m/s}}{3.0 \text{ m/s}}$$
$$\theta = \sin^{-1}\left(\frac{1.2 \text{ m/s}}{3.0 \text{ m/s}}\right)$$
$$= 24° \text{ W of N}$$

12.



$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$
$$= \frac{25 \text{ m/s}}{95 \text{ m/s}}$$
$$\theta = \sin^{-1}\left(\frac{25 \text{ m/s}}{95 \text{ m/s}}\right)$$
$$= 15° \text{ S of W or } 75° \text{ W of S}$$

