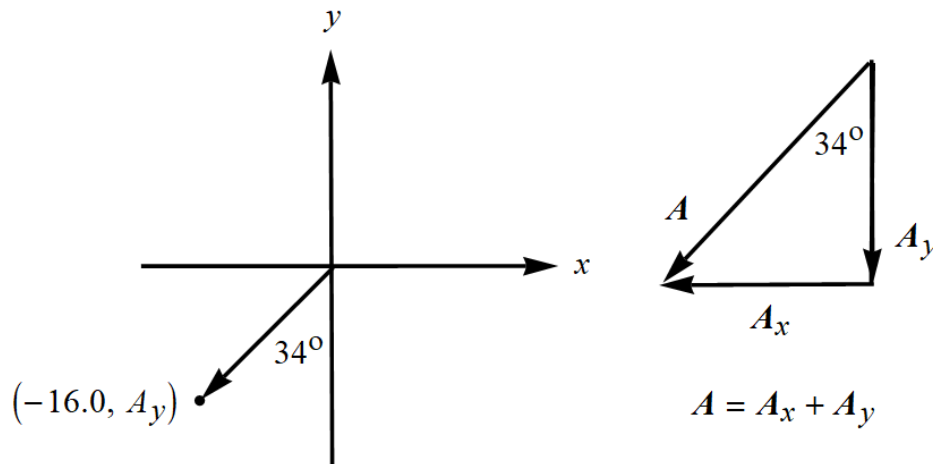


Exercise 1.32

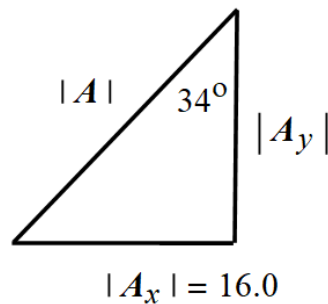
Vector \vec{A} is in the direction 34.0° clockwise from the $-y$ -axis. The x -component of \vec{A} is $A_x = -16.0$ m. (a) What is the y -component of \vec{A} ? (b) What is the magnitude of \vec{A} ?

Solution

Draw the vector \mathbf{A} in the xy -plane and decompose it into components along the x - and y -axes.



The triangle involving the magnitudes of these vectors is shown below.



Use trigonometry to determine $|\mathbf{A}_y|$ and the magnitude $|\mathbf{A}|$.

$$\tan 34^\circ = \frac{16.0}{|\mathbf{A}_y|} \quad \rightarrow \quad |\mathbf{A}_y| = \frac{16.0}{\tan 34^\circ} \approx 23.7 \text{ m}$$

$$\sin 34^\circ = \frac{16.0}{|\mathbf{A}|} \quad \rightarrow \quad |\mathbf{A}| = \frac{16.0}{\sin 34^\circ} \approx 28.6 \text{ m}$$

Since \mathbf{A}_y points down in the negative y -direction, there's a minus sign in the y -component of \mathbf{A} : $A_y \approx -23.7$ m.

$$\mathbf{A}_y = \langle 0, A_y \rangle \approx \langle 0, -23.7 \rangle \text{ m}$$