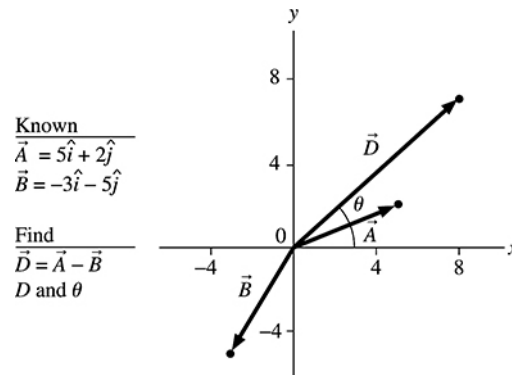


3.14. Visualize:



Solve: (a) We have $\vec{A} = 5\hat{i} + 2\hat{j}$, $\vec{B} = -3\hat{i} - 5\hat{j}$, and $-\vec{B} = +3\hat{i} + 5\hat{j}$. Thus, $\vec{D} = \vec{A} + (-\vec{B}) = 8\hat{i} + 7\hat{j}$.

(b) Vectors \vec{A} , \vec{B} and \vec{D} are shown in the above figure.

(c) Since $\vec{D} = 8\hat{i} + 7\hat{j} = D_x\hat{i} + D_y\hat{j}$, $D_x = 8$ and $D_y = 7$. Therefore, the magnitude and direction of \vec{D} are

$$D = \sqrt{(8)^2 + (7)^2} = 10.6 \quad \theta = \tan^{-1}\left(\frac{D_y}{D_x}\right) = \tan^{-1}\left(\frac{7}{8}\right) = 41^\circ$$

Assess: Since $|D_y| < |D_x|$, the angle θ is less than 45° , as it should be.