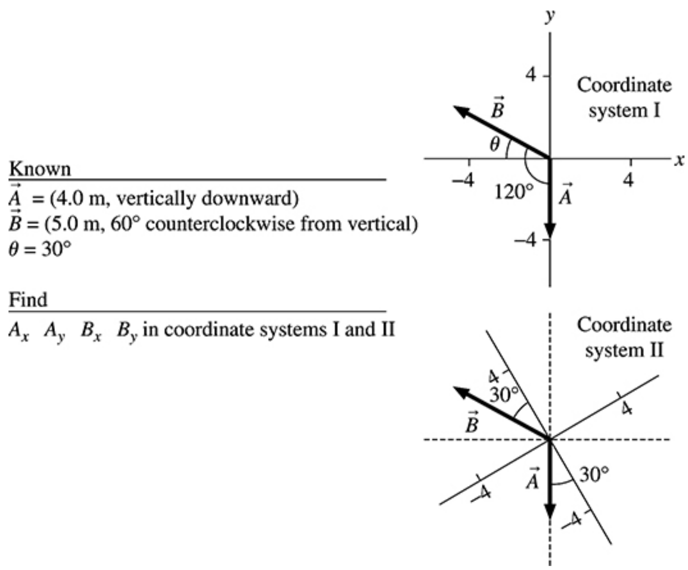
3.18. Visualize:



Solve: In coordinate system I, $\vec{A} = -(4\text{ m})\hat{j}$, so $A_x = 0$ m and $A_y = -4$ m. The vector $\vec{B}$ makes an angle of 60° counterclockwise from vertical, which makes it have an angle of $\theta = 30°$ with the –x-axis. Since $\vec{B}$ points to the left and up, it has a negative x-component and a positive y-component. That is, $B_x = -(5.0\text{ m})\cos 30° = -4.3$ m and $B_y = +(5.0\text{ m})\sin 30° = 2.5$ m. Thus, $\vec{B} = -(4.3\text{ m})\hat{i} + (2.5\text{ m})\hat{j}$.

In coordinate system II, $\vec{A}$ points to the left and down, and makes an angle of 30° with the –y-axis. Therefore, $A_x = -(4.0\text{ m})\sin 30° = -2.0$ m and $A_y = -(4.0)\cos 30° = -3.5$ m. This implies $\vec{A} = -(2.0\text{ m})\hat{i} - (3.5\text{ m})\hat{j}$. The vector $\vec{B}$ makes an angle of 30° with the +y-axis and is to the left and up. This means we have to manually insert a minus sign with the x-component. $B_x = -B\sin 30° = -(5.0\text{ m})\sin 30° = -2.5$ m, and $B_y = +B\cos 30° = (5.0\text{ m})\cos 30° = 4.3$ m. Thus $\vec{B} = -(2.5\text{ m})\hat{i} + (4.3\text{ m})\hat{j}$.