69. We adopt a coordinate system with $\hat{\imath}$ pointed east and $\hat{\jmath}$ pointed north; the coordinate origin is the flagpole. With SI units understood, we "translate" the given information into unit-vector notation as follows:

$$\vec{r}_o = 40\,\hat{\imath} \quad \text{and} \quad \vec{v}_o = -10\,\hat{\jmath}$$
$$\vec{r} = 40\,\hat{\jmath} \quad \text{and} \quad \vec{v} = 10\,\hat{\imath}\ .$$

(a) Using Eq. 4-2, the displacement $\Delta\vec{r}$ is

$$\vec{r} - \vec{r}_o = (56.6 \angle 135^\circ)$$

where we have expressed the result in magnitude-angle notation. The displacement has magnitude $40\sqrt{2} = 56.6$ m and points due Northwest.

(b) Eq. 4-8 shows that $\vec{v}_{\text{avg}}$ points in the same direction as $\Delta\vec{r}$, and that its magnitude is simply the magnitude of the displacement divided by the time ($\Delta t = 30$ s). Thus, the average velocity has magnitude $56.6/30 = 1.89$ m/s and points due Northwest.

(c) Using Eq. 4-15, we have

$$\vec{a}_{\text{avg}} = \frac{\vec{v} - \vec{v}_o}{\Delta t} = 0.333\,\hat{\imath} + 0.333\,\hat{\jmath}$$

in SI units. The magnitude of the average acceleration vector is therefore $0.333\sqrt{2} = 0.471\,\text{m/s}^2$, and it points due Northeast.