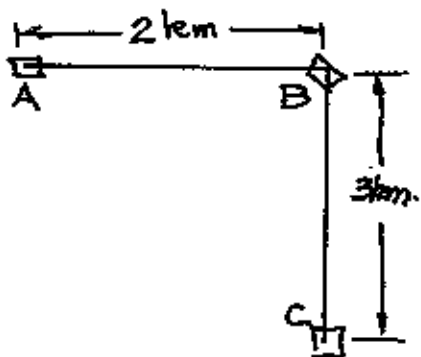


SIMPLE

HIBBELER

PROB. 12-70



a) MAGNITUDE of DISPLACEMENT
by definition, change in position
from pt. A to pt. C

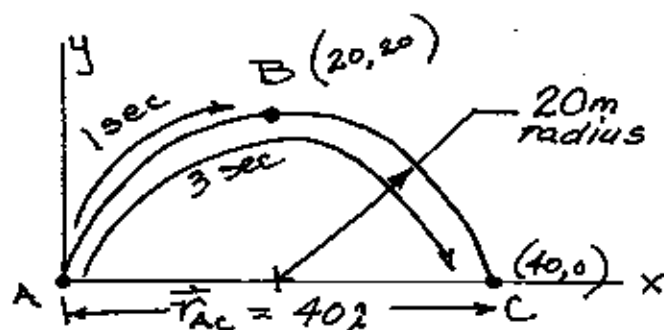
$$\vec{r}_{AC} = 2\hat{i} - 3\hat{j}$$

$$\therefore \text{MAG.} = \sqrt{2^2 + 3^2} = \boxed{3.61 \text{ km}}$$

b) DISTANCE TRAVELED

$$= \text{TOT. DIST.} = |\vec{r}_{AB}| + |\vec{r}_{BC}|$$

$$= 2 \text{ km} + 3 \text{ km} = \boxed{5 \text{ km}}$$



PROB. 12-71

? Avg. Velocity
from B to C

$$\left. \begin{array}{l} V_{A \rightarrow B} = 1 \text{ s} \\ V_{A \rightarrow C} = 3 \text{ s} \end{array} \right\} \therefore V_{B \rightarrow C} = 2 \text{ s}$$

REMEMBER: $V_{\text{avg}} = \frac{\text{change in 'position'}}{\text{change in time}} = \frac{(\vec{r}_C - \vec{r}_B)}{\Delta t}$

Use pt. A as origin of coordinate system,
therefore pt. A is the fixed reference for pts. B & C.

$$\vec{V}_{\text{avg}} = \frac{(40\hat{i}) - (20\hat{i} + 20\hat{j})}{2 \text{ sec}} = \frac{20\hat{i} - 20\hat{j}}{2} \frac{\text{m}}{\text{s}}$$

$$\vec{V}_{\text{avg}} = 10\hat{i} - 10\hat{j} \frac{\text{m}}{\text{s}}$$

$$|\vec{V}_{\text{avg}}| = \sqrt{10^2 + 10^2} = \boxed{14.14 \frac{\text{m}}{\text{s}}}$$