

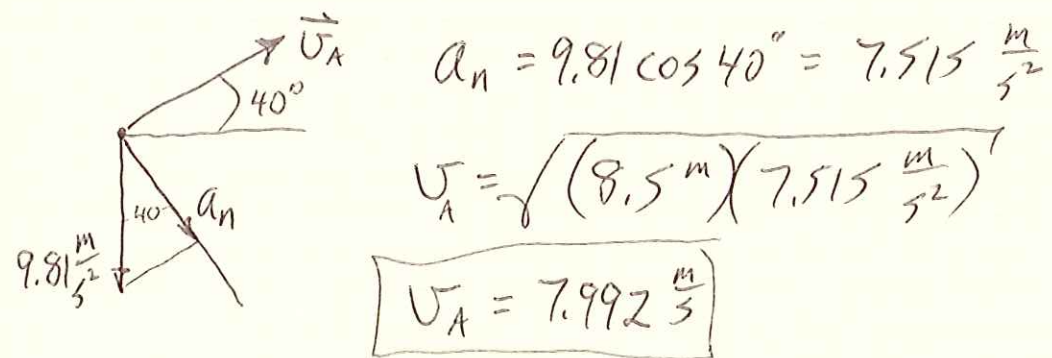
PROB. 11-144

$R_A = 8.5 \text{ m}$ ,  $\theta_A = 40^\circ$ , FIND  $\vec{V}_A$ , FIND  $S$  AT  $Y_{\max}$

$$\vec{V}_A = (V_A \cos 40^\circ) \hat{i} + (V_A \sin 40^\circ) \hat{j}$$

$$\vec{V}_A = (0.766 V_A) \hat{i} + (0.6428 V_A) \hat{j}$$

$$a_n = \frac{V^2}{S}, \quad V = \sqrt{S a_n}$$



$$a_n = 9.81 \cos 40^\circ = 7.515 \frac{\text{m}}{\text{s}^2}$$

$$V_A = \sqrt{(8.5 \text{ m}) \left( 7.515 \frac{\text{m}}{\text{s}^2} \right)}$$

$$\boxed{V_A = 7.992 \frac{\text{m}}{\text{s}}}$$

$$\text{At } Y_{\max}, \quad V_x = (V_x)_0 = (7.992 \frac{\text{m}}{\text{s}}) (0.766) = 6.122 \frac{\text{m}}{\text{s}}$$

$$S = \frac{V^2}{a_n} = \frac{(6.122 \frac{\text{m}}{\text{s}})^2}{(9.81 \frac{\text{m}}{\text{s}^2})} = \boxed{3.821 \text{ m}}$$