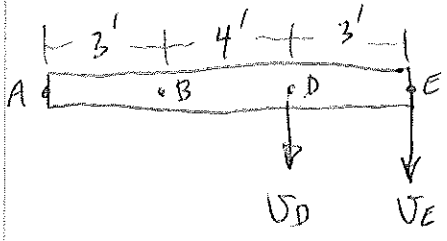
PROB. 15.73



$V_D = -24 \frac{IN}{SEC} = -2 \frac{ft}{SEC}$, $V_E = -3 \frac{ft}{SEC}$

a) FIND INSTANTANEOUS CENTER

$$m = \frac{V_E - V_D}{X_E - X_D} = \frac{(-3) - (-2) \frac{ft}{SEC}}{(10-7)\,ft}$$

$$m = -\frac{1}{3} \frac{1}{SEC}$$

$$Y - Y_1 = m(X - X_1)$$

$$V_C - V_D = m(X_C - X_D) \Rightarrow X_C = X_D + \frac{1}{m}(V_C - V_D)$$

$$X_C = X_D - \frac{V_D}{m} = (7\,ft) - \frac{(-2 \frac{ft}{SEC})}{(-\frac{1}{3} \frac{1}{SEC})} \boxed{= 1\,ft}$$

b) FIND V_A

$$V_D = r_{CD} \cdot \omega, \quad \omega = \frac{V_D}{r_{CD}} = \frac{(-2 \frac{ft}{SEC})}{(7-1\,ft)} = \frac{1}{3} \frac{RAD}{SEC}$$

$$V_A = r_{CA} \cdot \omega = (1\,ft)(\frac{1}{3} \frac{RAD}{SEC}) = \frac{1}{3} \frac{ft}{SEC} \boxed{= 4 \frac{IN}{SEC}} \uparrow$$