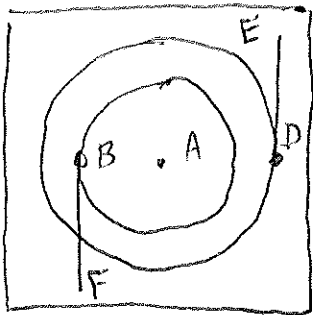


PROB. 15-78



$$V_E = 200 \frac{\text{MM}}{\text{SEC}} \uparrow, \quad V_F = 160 \frac{\text{MM}}{\text{SEC}} \downarrow$$

$$r_B = 30 \text{ MM}, \quad r_D = 60 \text{ MM}$$

a) FIND C

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

$$Y = Y_D + m(X - X_D)$$

$$m = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{Y_D - Y_B}{X_D - X_B}$$

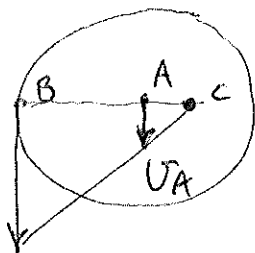
$$m = \frac{(200) - (-160) \frac{\text{MM}}{\text{SEC}}}{(60) - (-30) \text{ MM}} = 4 \frac{1}{\text{SEC}}$$

$$Y = (200) + (4)(X - 60), \quad Y = 4X - 40$$

AT  $Y = 0$ ,  $X = C = 10 \text{ MM}$

b) FIND  $V_A$

$$V_B = r_{CB} \omega, \quad \omega = \frac{V_B}{r_{CB}} = \frac{(160 \frac{\text{MM}}{\text{SEC}})}{(30 + 10 \text{ MM})}$$



$$\omega = 4 \frac{\text{RAD}}{\text{SEC}}$$

$$V_A = r_C \omega = (10 \text{ MM}) \left( 4 \frac{\text{RAD}}{\text{SEC}} \right) = 40 \frac{\text{MM}}{\text{SEC}} \downarrow$$

$V_B$

c) RELATIVE VELOCITIES:

$$V_{BF} = 160 - 40 = 120 \frac{\text{MM}}{\text{SEC}}$$

$$V_{DE} = 200 + 40 = 240 \frac{\text{MM}}{\text{SEC}}$$