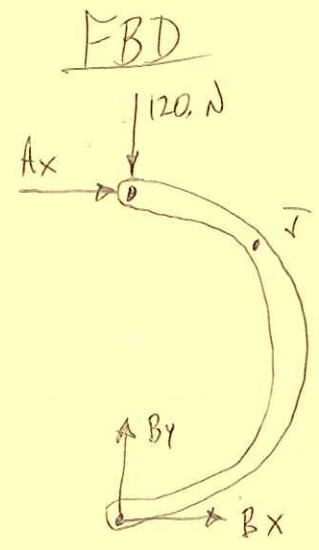
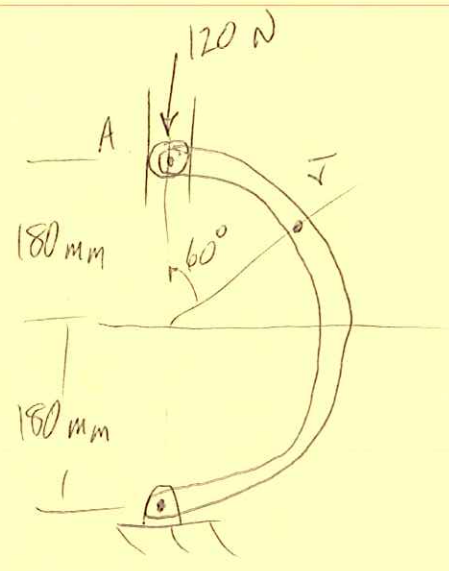


HOMWORK #7: 7.7, 7.16, 7.40, 7.52, 7.80

PROB. 7.7

DETERMINE INTERNAL FORCES AT J.

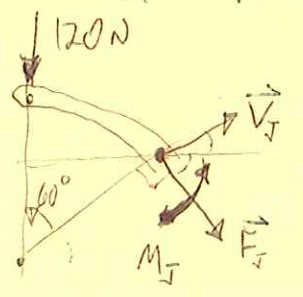


$$\sum M_B = 0 \quad + \curvearrowright : \quad -(360 \text{ mm})(A_x) = 0 \quad \therefore A_x = 0$$

$$\sum F_x = 0 : A_x + B_x = 0 \quad \therefore B_x = 0$$

$$\sum F_y = 0 : B_y - 120 = 0 \quad B_y = 120 \text{ N}$$

FBD OF AJ:



$$\vec{V}_J = (\cos 30^\circ V) \hat{i} + (\sin 30^\circ V) \hat{j}$$

$$\vec{V}_J = (0.866 V) \hat{i} + (0.5 V) \hat{j}$$

PROB. 7.7 CONT.

$$\vec{F}_J = (\cos 60^\circ F) \hat{i} + (-\sin 60^\circ F) \hat{j}$$

$$\vec{F}_I = (0.5 F) \hat{i} + (-0.866 F) \hat{j}$$

$$\sum F_x = 0: 0.866 V + 0.5 F = 0 \Rightarrow V = -0.577 F$$

$$\sum F_y = 0: 0.5 V - 0.866 F - 120 = 0$$

$$0.5(-0.577 F) - 0.866 F - 120 = 0$$

$$-1.15 F = 120$$

$$F = -104 \text{ N}$$

$$V = -0.577(-104) = 60.2 \text{ N}$$

$$\sum M_J = 0 \quad +\curvearrowright: M_J + (120 \text{ N})(180 \sin 60^\circ \text{ mm}) = 0$$

$$M_J = -1.87 \times 10^4 \text{ N-mm} = -18.7 \text{ N-m}$$