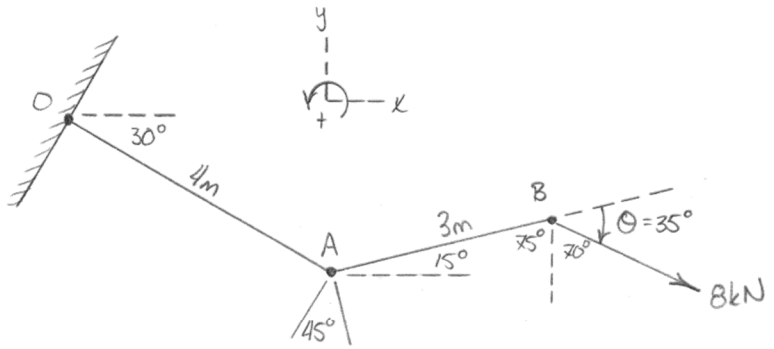
2/55



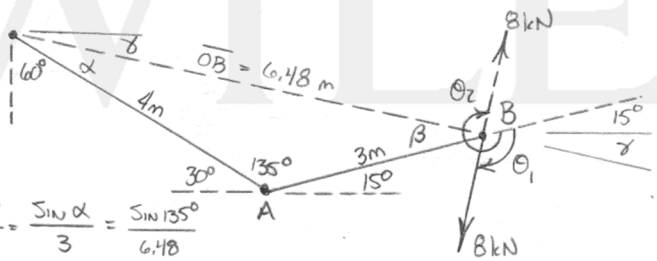
$$\underline{M}_O = \left[(4\cos 30^\circ + 3\cos 15^\circ)\underline{i} + (-4\sin 30^\circ + 3\sin 15^\circ)\underline{j}\right] \times (8\sin 70^\circ \underline{i} - 8\cos 70^\circ \underline{j})$$

$$\therefore \quad \underline{M}_O = -8.21\,\underline{k}\ \text{kN·m}$$

$$\underline{M}_A = -8\sin 35^\circ (3)\,\underline{k} \longrightarrow \underline{M}_A = -13.77\,\underline{k}\ \text{kN·m}$$

• ANGLE TO FIND A MAXIMUM MOMENT AT O: THE FORCE MUST BE PERPENDICULAR TO LINE $\overline{OB}$.

$$\overline{OB} = \sqrt{4^2 + 3^2 - 2(4)(3)\cos 135^\circ} \longrightarrow \overline{OB} = 6.48\,\text{m}$$



$$\frac{\sin\beta}{4} = \frac{\sin\alpha}{3} = \frac{\sin 135^\circ}{6.48}$$

$$\beta = 25.9^\circ$$

$$\alpha = 19.11^\circ$$

$$\gamma = 90^\circ - 60^\circ - 19.11^\circ = 10.89^\circ$$

$$\Theta_1 = 90^\circ + 15^\circ + 10.89^\circ \longrightarrow \Theta_1 = 115.9^\circ$$

$$\Theta_2 = \Theta_1 + 180^\circ \longrightarrow \Theta_2 = 296^\circ$$

$$M_{MAX} = \overline{OB}\,F = 6.48(8) \longrightarrow M_{MAX} = 51.8\ \text{kN·m}$$