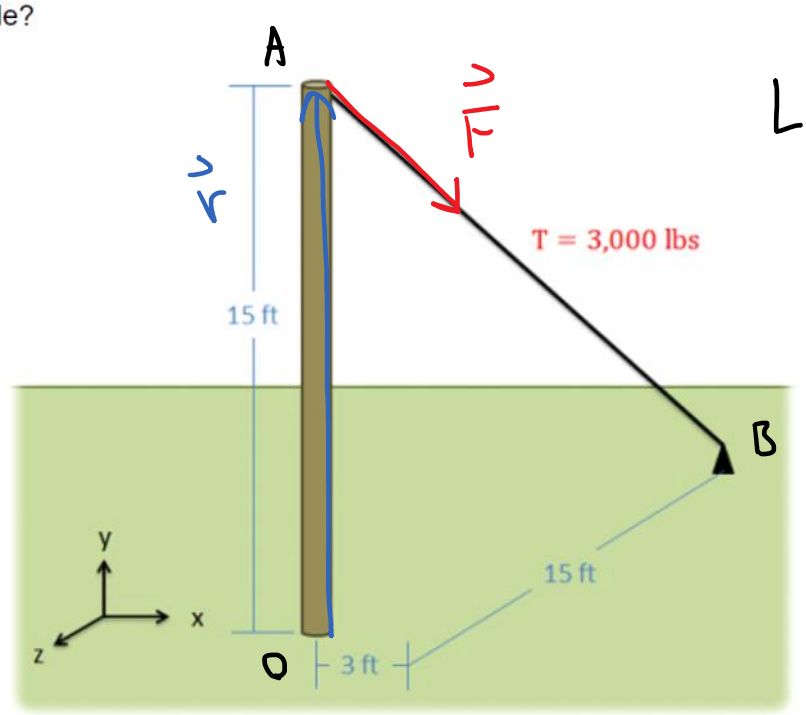
Question 4

A cable attached to the top of a pole as shown below carries a 3000 lb tension force.

- What is the moment vector this causes about the base of the pole?
- What is the overall magnitude of the moment about the base of the pole?



$$L_{AB} = \sqrt{15^2+3^2+15^2}$$

$$L_{AB} = 21.4 \text{ ft}$$

$$\vec{r} = [0, 15, 0] \text{ ft}$$

$$F_x = 3000\left(\frac{3}{21.4}\right) = 420.08 \text{ lbs}$$

$$F_y = 3000\left(\frac{-15}{21.4}\right) = -2100.42 \text{ lbs}$$

$$F_z = 3000\left(\frac{-15}{21.4}\right) = -2100.42 \text{ lbs}$$

$$\vec{F} = [420.08, -2100.42, -2100.42] \text{ lbs}$$

$$\vec{M}_o = \vec{r} \times \vec{F} = \left[-31506.3,\ 0,\ -6301.2\right] \text{ ft lbs}$$

$$M_o = \sqrt{(-31506.3)^2 + (-6301.2)^2} = 32{,}130 \text{ ft lbs}$$