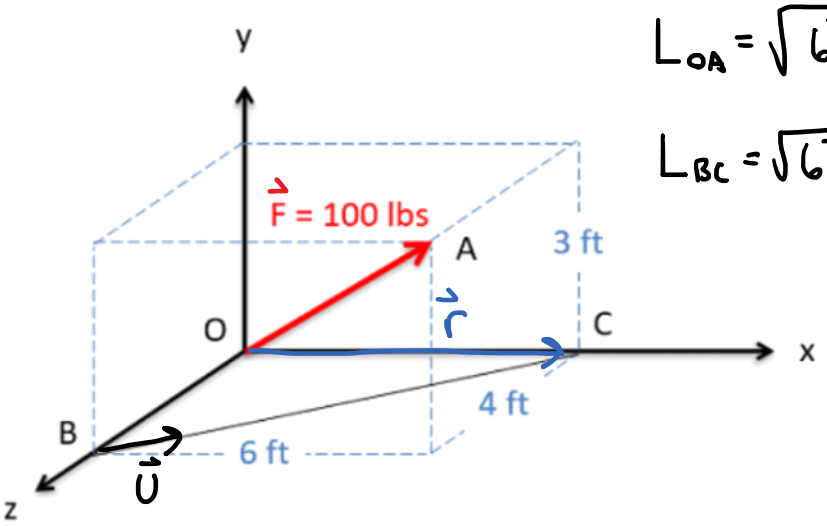
Question 2

A 100 lb force acts along the line connecting points O and A in the diagram below. What moment does this force exert about the axis connecting points B and C?



$$L_{OA} = \sqrt{6^2 + 4^2 + 3^2} = \sqrt{61}$$

$$L_{BC} = \sqrt{6^2 + 4^2} = \sqrt{52}$$

$$\vec{r} = [6, 0, 0]$$

$$\vec{F} = \left[100\frac{6}{\sqrt{61}}, 100\frac{3}{\sqrt{61}}, 100\frac{4}{\sqrt{61}}\right]$$

$$\vec{M} = \vec{r} \times \vec{F} = \left[0, -\frac{2400}{\sqrt{61}}, \frac{1800}{\sqrt{61}}\right]$$

$$\vec{u} = \left[\frac{6}{\sqrt{52}}, 0, -\frac{4}{\sqrt{52}}\right]$$

$$M = \vec{u} \cdot \vec{M} = -\frac{3600}{\sqrt{793}} = \boxed{-127.8 \text{ ft lbs}}$$