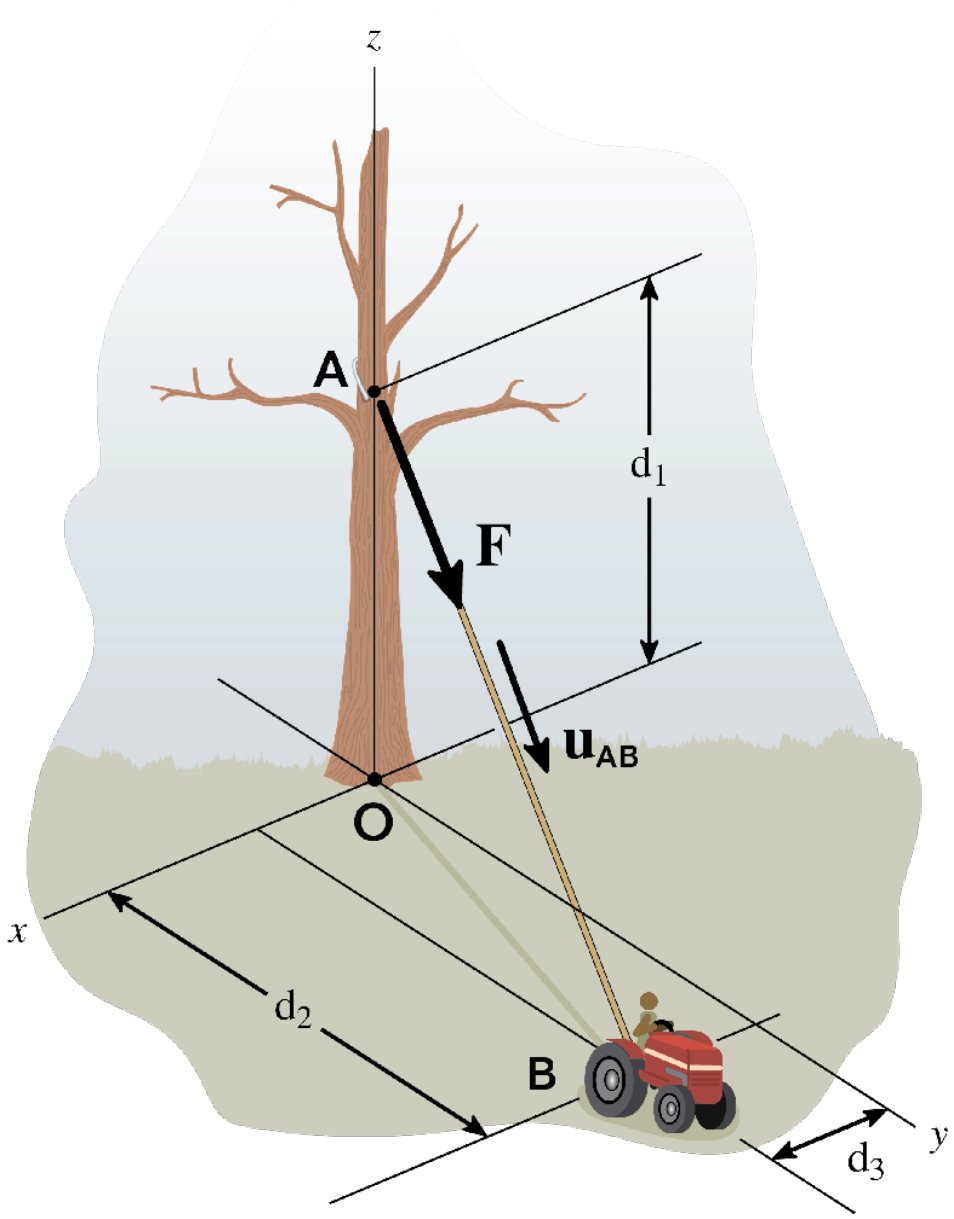

A tractor at B attempts to pull down the tree with a rope tied to point A. If there is a tension of F in the rope, express the force as a cartesian vector and find its coordinate direction angles.

Express the force as a cartesian vector.

$$AB = \sqrt{d_1{}^2 + d_2{}^2 + d_3{}^2}$$

$$F_x = \frac{F}{AB} d_3$$

$$F_y = \frac{F}{AB} d_2$$

$$F_z = -\frac{F}{AB} d_1$$

$$\vec{F} = \frac{F}{AB} \cdot (d_3 \hat{i} + d_2 \hat{j} - d_1 \hat{k})$$

Find the coordinate direction angles of $\vec{F}$.

$$\alpha = \cos^{-1}\left(\frac{F_x}{F}\right)$$

$$\beta = \cos^{-1}\left(\frac{F_y}{F}\right)$$

$$\gamma = \cos^{-1}\left(\frac{F_z}{F}\right)$$