Shelf in equilibrium

A uniform shelf of weight $W = 20$ N and of width $l = 0.6$ m is hinged horizontally to a vertical wall and suspended by a cable as shown in the figure. What is the tension T in the cable?

Solution:
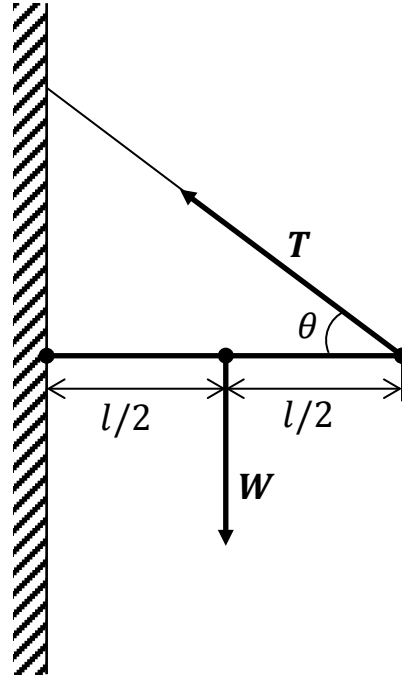
Since the shelf is in equilibrium, according to the principle of moments we obtain

$$W \cdot \frac{l}{2} = T \sin \theta \cdot l$$

Therefore

$$T = \frac{W}{2 \sin \theta}$$

Answer: $\frac{W}{2 \sin \theta}$.