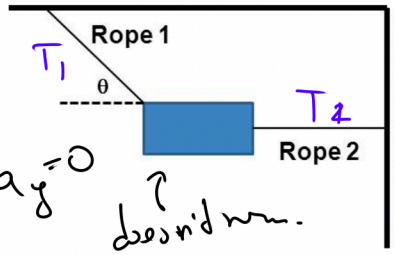
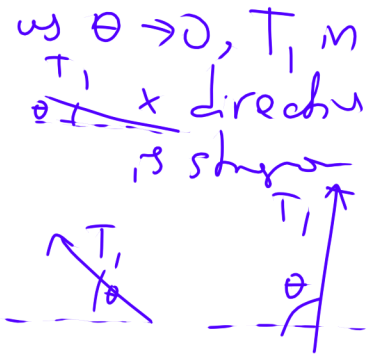
A 5 kg block is suspended with two ropes.

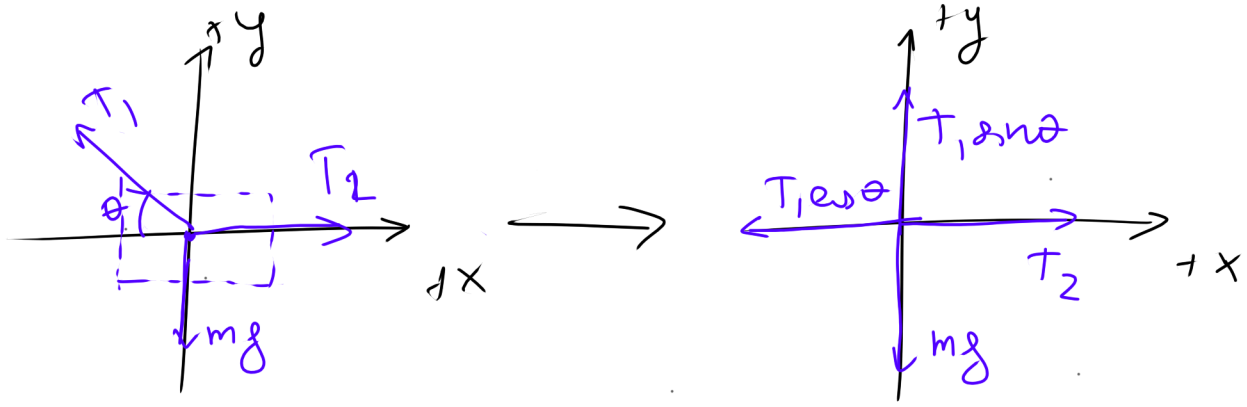


$a_x = a_y = 0$ (block is stationary)



What is the tension in rope 1 (in N) if the θ = 30°?

(1)



$$(F_{net})_x = T_2 - T_1 \cos\theta = m a_x = 0$$

$$(F_{net})_y = T_1 \sin\theta - mg = m a_y = 0$$

$$\Rightarrow T_2 = T_1 \cos\theta \quad \text{and} \quad T_1 \sin\theta = mg$$

$$T_1 = \frac{mg}{\sin\theta}$$

$$= \frac{5 \cdot 9.8}{\sin 30^\circ}$$

$$= 98\ N.$$

$$T_2 = 98\ N \cdot \cos\theta = 98 \cdot \cos 30^\circ = \frac{98\sqrt{2}}{2}\ N.$$

II