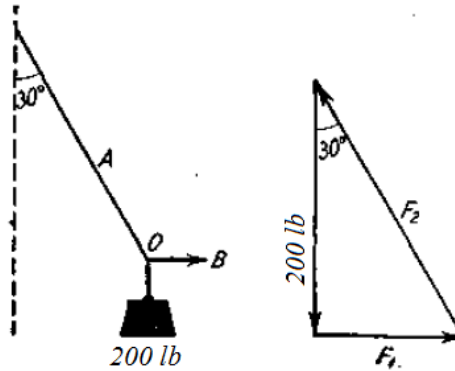


Answer on Question #53197, Physics / Other

An object weighing 200 lbs is suspended by a rope. Rope A is pulled by the horizontal Rope B and held so that Rope A makes an angle of 30 degree with the vertical. Find the tension in Rope A and B.

Solution:



We know that the junction O is in equilibrium under the action of these forces, hence their resultant must be zero. Therefore, the vectors representing the three forces can be combined to form a closed triangle, as shown at the right in Fig.

In constructing the vector diagram each vector is drawn parallel to the force that it represents.

In solving the vector triangle it is seen that

$$\frac{F_1}{200} = \tan 30^\circ = 0.57735$$

Thus, the tension in rope B

$$F_1 = (200 \text{ lb})(0.57735) = 115.5 \text{ lb}$$

To get tension in rope A

$$F_2 = \frac{200 \text{ lb}}{\cos 30^\circ} = 230.9 \text{ lb}$$

Answer: The tension in horizontal rope is 115.5lb. The tension in rope A is then 230.9 lb.