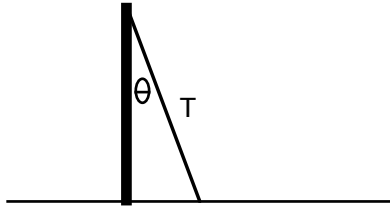
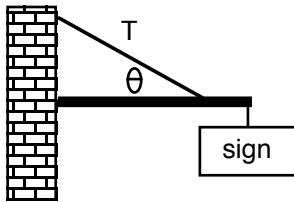


Torque Problems

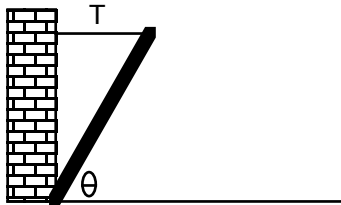
1. A flagpole is 25 meters high. Someone is trying to pull it down by pulling on the ropes, which attach at the top and make an angle of 15° between the pole and the rope. The tension in the rope is 500 N. What is the resulting torque on the flagpole? How could the person increase the torque, without increasing the tension in the rope?



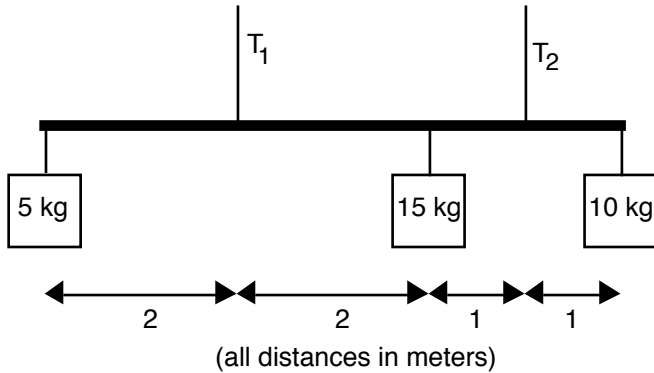
2. A sign of mass 75 kg is hung from a pole of mass 15 kg and length 1.5 meters as shown. The pole is hung from a wall so that it is horizontal, and there is an additional support wire, also shown. If the angle between the wire and the pole is 30° , and it attaches to the pole 1 meter from the wall, what is the tension in the wire?



3. A rod of length of 3 meters is leaning at an angle of 25° , as shown. It is also supported by a horizontal wire attached to its end. If the tension in the wire is 400 N, what is the mass of the rod?



4. A horizontal bar of mass 25 kg is suspended from two wires as shown. There are also three masses hanging from the bar, as shown. What are the tensions in the two wires?



Answers:

1. $t = 3240 \text{ Nm}$

2. $T = 2480 \text{ N}$

3. $M = 37.3 \text{ kg}$

4. $T_1 = 267 \text{ N}$ & $T_2 = 283 \text{ N}$