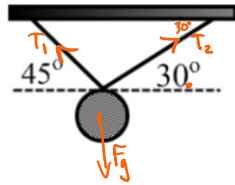
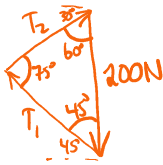
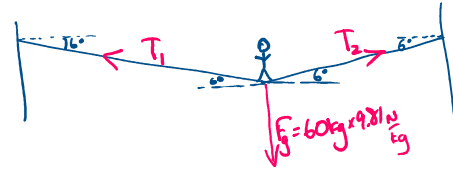


## Lesson 1: Extra Practice

1. A tightrope walker, who has a mass of 60.0 kg moves to the center of the wire, which causes the wire to sag and make a  $6.0^\circ$  angle with the horizontal. Calculate the tension in the wire.
2. A mirrored sphere, weighing 200.0 N is suspended from the ceiling of a ballroom by two cables as shown in the diagram. What is the tension in each of these cables?



$$\frac{T_1}{\sin 60^\circ} = \frac{200}{\sin 75^\circ}$$

$$T_1 = 179.3 = 180 \text{ N}$$

$$\frac{T_2}{\sin 45^\circ} = \frac{200}{\sin 75^\circ}$$

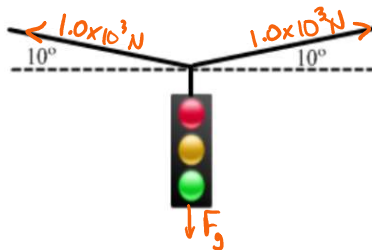
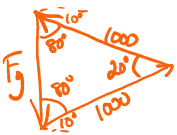
$$T_2 = 146 = 150 \text{ N}$$



$$\frac{T_1}{\sin 84^\circ} = \frac{588.6}{\sin 12^\circ}$$

$$T_1 = 2800 \text{ N} = T_2$$

3. A traffic light is supported by a cable that makes an angle of  $10^\circ$  with the horizontal on each side of the light. The maximum safe tension in cable is  $1.0 \times 10^3 \text{ N}$ . What is the maximum safe mass for the light?

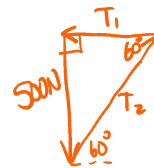
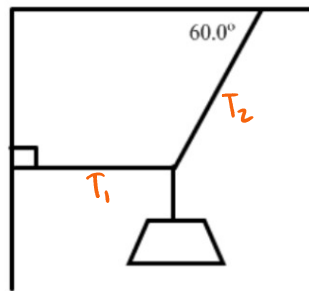


$$\frac{F_g}{\sin 20^\circ} = \frac{1000}{\sin 80^\circ}$$

$$F_g = 347.296$$

$$m = \frac{F_g}{g} = 35 \text{ kg}$$

4. Calculate the tension in the two cords that support the 500.0 N weight as shown in the diagram.



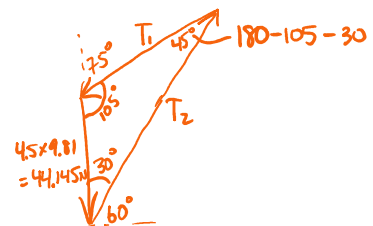
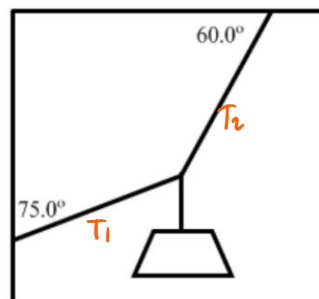
$$\tan 60^\circ = \frac{500}{T_1}$$

$$T_1 = 289 \text{ N}$$

$$\sin 60^\circ = \frac{500}{T_2}$$

$$T_2 = 577 \text{ N}$$

5. Calculate the tension in the two cords that support the 4.50 kg mass as shown in the diagram.

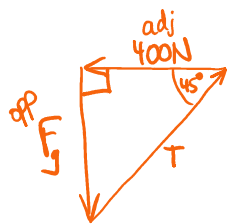


$$\frac{T_1}{\sin 30^\circ} = \frac{44.145 \text{ N}}{\sin 45^\circ}$$

$$T_1 = 31.2 \text{ N}$$

$$T_2 = 44.145 \text{ N}$$

6. Calculate the mass of the suspended object, given the tension in the horizontal cord shown in the diagram is 400.0 N.

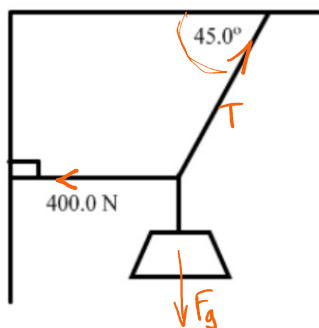


$$\tan 45^\circ = \frac{F_g}{400}$$

$$F_g = 400 \tan 45^\circ$$

$$= 400 \text{ N}$$

$$m = \frac{400 \text{ N}}{9.8 \frac{\text{m}}{\text{s}^2}} = 40.8 \text{ kg}$$



$$\cos 45^\circ = \frac{400}{T}$$

$$T = \frac{400}{\cos 45^\circ}$$

$$= 566 \text{ N}$$

$$T_1 = 31.2 \text{ N}$$

$$\frac{T_2}{\sin 105^\circ} = \frac{44.145 \text{ N}}{\sin 45^\circ}$$

$$T_2 = 60.3 \text{ N}$$