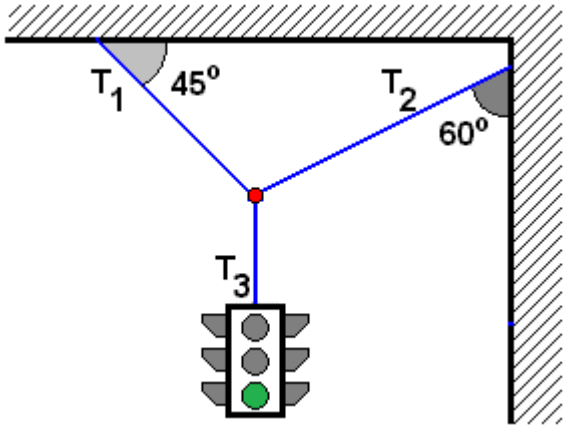
Physics I

Statics knots

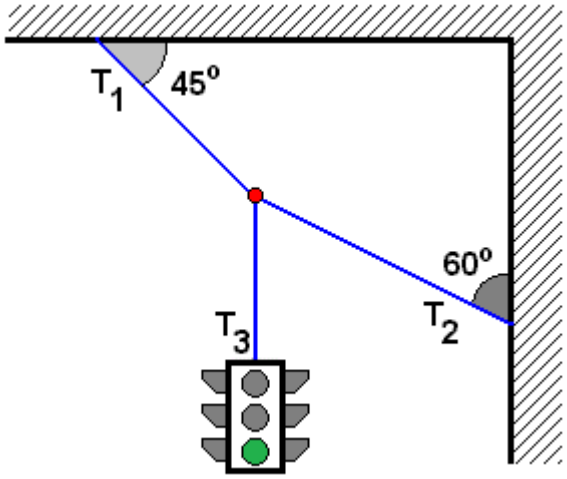
Equilibrium equations $\sum F = 0$ and $\sum \tau = 0$ Where $\tau = Fr\sin\angle_F^r$

Law of sines $\frac{F_1}{\sin\theta_1} = \frac{F_2}{\sin\theta_2} = \frac{F_3}{\sin\theta_3}$

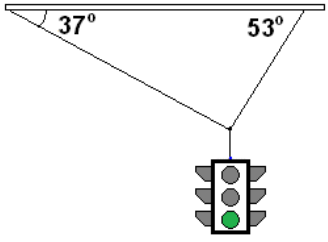
Problem 1.- The mass of the traffic light in the figure is 40 kg, so the tension T_3 is 392N. Calculate the tensions T_1 and T_2.



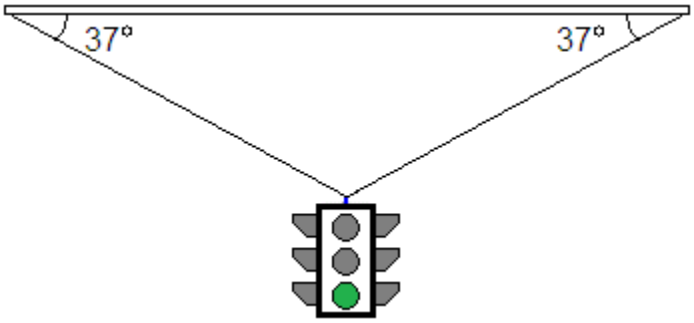
Problem 1a: The mass of the traffic light in the figure is 50 kg, so the tension T_3 is 490 N. Calculate the tensions T_1 and T_2.



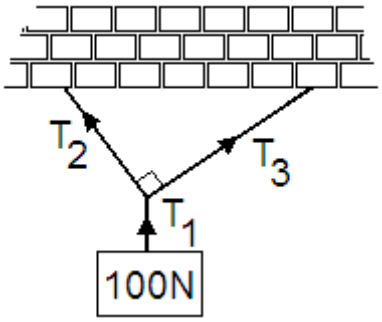
Problem 2.- Find the tension in the cables given that the mass of the traffic light is 50 kg.



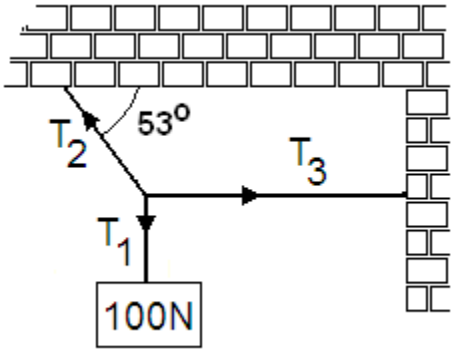
Problem 3.- Find the tension in the cables given that the mass of the traffic light is 88 kg.



Problem 4.- Which tension is the smallest? Which one the largest? Defend your answer with a vector diagram or equations.



Problem 4a.- Find the tension on the strings.



Problem 5.- Karl Petit, a circus performer, walks across a "tight rope" strung horizontally between two supports separated by a distance **d=12 m**. The sag in the rope when he is at the midpoint is **θ=15º**. Calculate the tension in the rope at that point knowing that Karl Petit's mass is **m=55 kg**.