

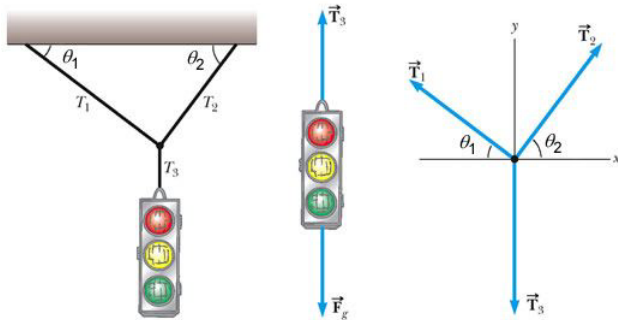
Problem Set 4

Instructions:

1. Answer all questions below. All questions have equal weight.
2. All problems are due Tues 5 June 2012 at the start of lecture.
3. You may collaborate, but everyone must turn in their own work.

1. A 3.00 kg object is moving in a plane, with its x and y coordinates in meters given by $x = 5t^2 - 1$ and $y = 3t^3 + 2$, where t is in seconds. What is the magnitude of the net force acting on this object at $t = 2.00$ s?

2. A traffic light weighing $mg = 123$ N hangs from a cable tied to two other cables fastened to a support, as in the figure below. The upper cables make angles of $\theta_1 = 40^\circ$ and $\theta_2 = 50^\circ$ with the horizontal. Find the magnitudes of \vec{T}_1 , \vec{T}_2 , and \vec{T}_3 .



3. Two blocks of masses m_1 and m_2 ($m_1 > m_2$) are placed in contact on a horizontal, frictionless surface, as shown in the figure below. A constant horizontal force of $\vec{F} = 115$ N is applied to m_1 as shown. Find the magnitude of the acceleration of the two blocks.

