

PHYS 1443 – Section 003

Lecture #9

Wednesday, Sept. 22, 2004

Dr. **Jaehoon Yu**

1. Forces of Friction
2. Uniform and Non-uniform Circular Motions
3. Resistive Forces and Terminal Velocity
4. Newton's Law of Universal Gravitation
5. Kepler's Laws

Homework #6 due at 1pm next Wednesday, Oct. 6!!

Remember the first term exam next Monday, Sept. 27!!



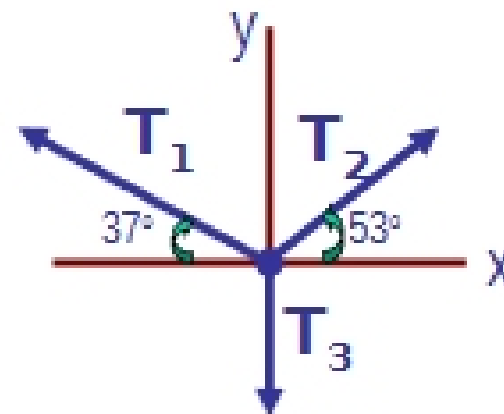
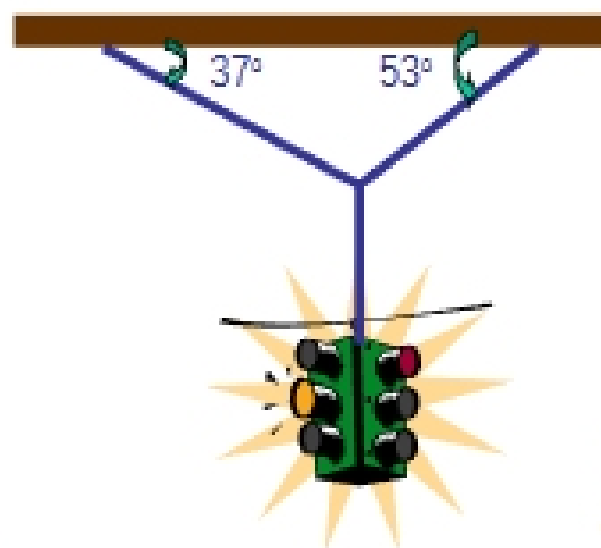
Announcements

- Quiz Results
 - Class Average: 3.6/8
 - Top score: 7
 - We have a few more quizzes through the semester
- Remember the 1st term exam, **Monday, Sept. 27**
 - 1:00 – 2:20pm in class
 - Covers Chapters 1 - 6.4
 - Mixture of multiple choice and free style problems
 - PLEASE DO NOT Miss the exam!!!!



Example for Using Newton's Laws

A traffic light weighing 125 N hangs from a cable tied to two other cables fastened to a support. The upper cables make angles of 37.0° and 53.0° with the horizontal. Find the tension in the three cables.



$$\vec{F} = \vec{T}_1 + \vec{T}_2 + \vec{T}_3 = m\vec{a} = 0 \quad \text{Newton's 2nd law}$$

x-comp. of net force

$$F_x = \sum_{i=1}^3 T_{ix} = 0 \quad - T_1 \cos(37^\circ) + T_2 \cos(53^\circ) = 0 \quad T_1 = \frac{\cos(53^\circ)}{\cos(37^\circ)} T_2 = 0.754 T_2$$

y-comp. of net force

$$F_y = \sum_{i=1}^3 T_{iy} = 0$$

$$T_1 \sin(37^\circ) + T_2 \sin(53^\circ) - mg = 0$$

$$T_2 [\sin(53^\circ) + 0.754 \times \sin(37^\circ)] = 1.25 T_2 = 125 \text{ N}$$

$$T_2 = 100 \text{ N}; \quad T_1 = 0.754 T_2 = 75.4 \text{ N}$$

