

**Final Exam: May 13<sup>th</sup>, Wednesday**

Time : 8:30-11 am (arrive by 8:15 am)

**Room: Cullimore Lecture Hall 3.**

Check website for formula sheet

Preparing for final exam:

Solve old final exams posted on web !!

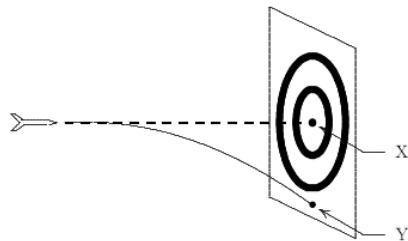
Solve quiz problems !!

Solve three common exam problems.

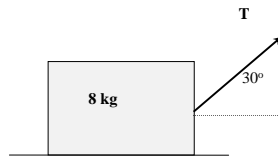
Review today: 5-6 examples

1. A projectile is launched from a level plane at **30 degree** from horizontal with an initial speed of **88.5 m/s**. What is the maximum height above the plane the projectile will reach?

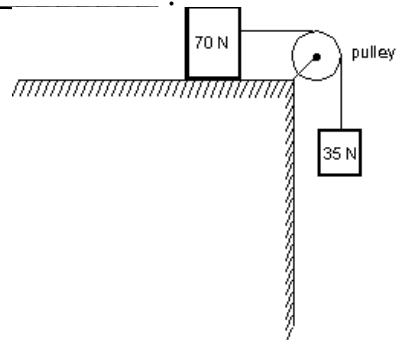
2. A rifle is aimed horizontally at the center of a large target 60 m away. The initial speed of the bullet is 240m/s. What is the distance from the center of the target to the point where the bullet strikes the target (XY)?



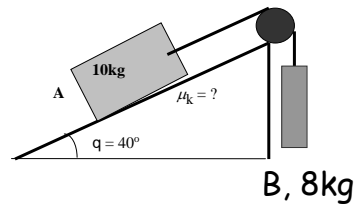
3. A 8-kg block is pulled along a rough horizontal surface ( $\mu_k = 0.2$ ) by a rope that exerts an 30 N tension force directed 30 degree above the horizontal. What is the magnitude of the friction force on the block?



4. Two blocks with the masses of **7.1 kg** and **3.6 kg** (their weights are approximately 70N and 35N) are connected by a string as shown. If the pulley is massless and the surface is frictionless, the magnitude of tension in the string is \_\_\_\_\_.



5. Two blocks are connected over a pulley as shown in the figure. The mass of the block A is 10 kg and the mass of the hanging block B is 8 kg. The block A *slides up the 40 degree-incline at a constant speed*. There is a friction force between the incline and the block A.



- (a) Find the tension in the string .
- (b) Find the normal force that the incline exerts on block A.

6. A vertical spring stretches 8 cm when a 1.6 kg block is hung from its end.

- (a) What is the spring constant of the spring?
- (b) What is the Elastic Potential Energy of the spring?

7. An athlete of mass 70 kg on a trampoline leaps straight up into the air with an initial speed of 9.0 m/s. Find the kinetic energy of the athlete when she is halfway up to her maximum height.

### 8. iClicker Quiz

A 0.2-kg rubber ball is dropped from the window of a building. It strikes the sidewalk below at 30m/s and rebounds up at 20m/s. The impulse on the ball during the collision is:

- A. 10N · s upward
- B. 10N · s downward
- C. 2.0N · s upward
- D. 2.0N · s downward
- E. 9.8N · s upward