

Physics review questions 2011 – Student generated

1. Kirby is hungry and is trying to eat a 100 pound block. The block is 10 feet away with a frictional force of 200 N on an incline of 66 degrees.
 - a) If Kirby is only capable of performing 200 joules of work, can he eat it?
 - b) Kirby is tired and can only perform 800 joules so he walks 5 feet closer. Can he still eat it?
 - c) Explain what each force does to the block.

2. SpongeBob has accidentally dropped Gary out of a 70 foot window at the top of the Sea Needle. Luckily, Patrick Star sees this happening, and even though, he is 20 feet away, he runs to save Gary. Patrick runs with an initial velocity of 6 m/s. Assume Gary's initial velocity is 0 m/s and that Patrick's final velocity will be 0 m/s as he will hopefully wait directly under Gary.
 - a. What is Gary's velocity just before he is suspected to be caught?
 - b. How long does it take Gary to fall?
 - c. Does Patrick reach Gary in time?
 - i. Bonus: What super heroes could SpongeBob count on to save Gary?

3. A quarterback throws a football 55ft/s at 30 degrees above the horizontal towards a receiver 45 yards downfield. The quarterback releases the ball 6.0 feet above the ground and the receiver catches it 6 feet above the ground.
 - a. Will the pass be completed?
 - b. What distance will the ball go?
 - c. What angle should the football be thrown at if the ball takes 3 seconds to reach the receiver?
 - d. What significance does the velocity in the x and the velocity in the y play?

4. Crash Bandicoot is riding his polar bear through the snow when he makes a wrong turn. They begin to slide down an incline plane toward a flamethrower.
 - a. Draw the situation showing all forces.
 - b. If they slide at a 30 degree angle with a combined mass of 150 pounds, what are the forces of friction and parallel? ($\mu = .25$)
 - c. Will they die if they are 225 feet away from the flames? (Time = 10 seconds) Assume his initial velocity is 6.562 feet/ second square.
 - d. Why is it that the frictional force didn't stop them completely?
(1 pound = .4536 kg), (1ft= .3048 meters)