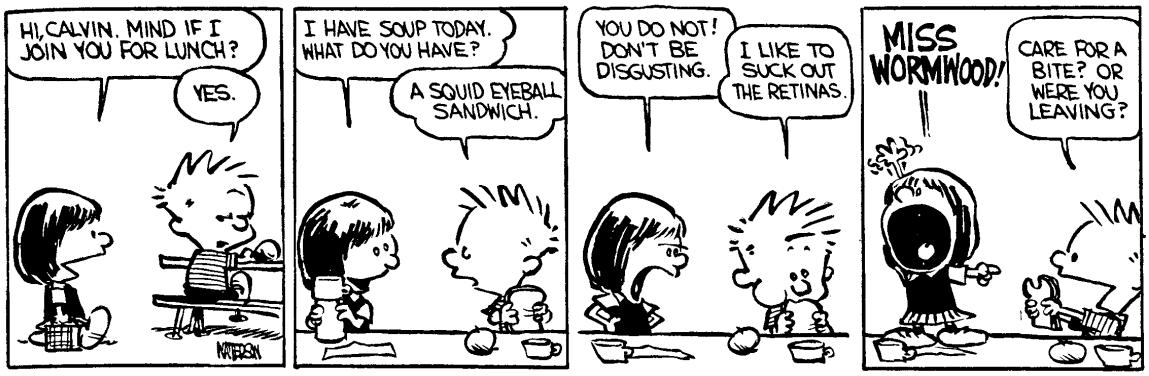
AP Physics – Newton's Laws – 6

You is Who _____Per___

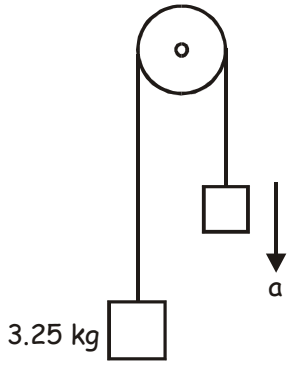


A baby is God's opinion that life should go on. -- Carl Sandburg

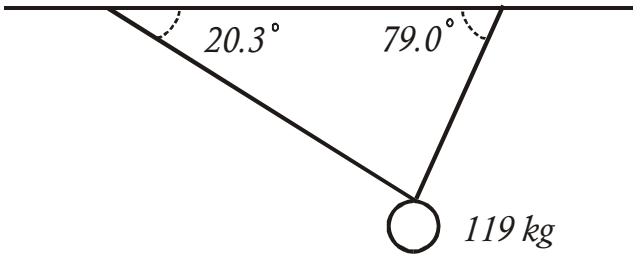
1. A small weather rocket weighs 15.7 N. (a) What is the rocket's mass? (b) The rocket fires its engine when it is dropped from a balloon at high altitude. If the rocket has a thrust of 109.2 N, what is the acceleration on the rocket?

2. A boy pulls a 47.5 kg crate with a rope. The rope makes an angle of 28.0° to the horizontal. The coefficient of kinetic friction for the crate and the deck is 0.300. The boy exerts a force of 185 N. What is the acceleration of the crate?

3. Two of these here masses are connected by a very light weight string that passes over your basic very low friction pulley. The mass on the left is 3.25 kg. The 3.25 kg mass accelerates upward at 0.345 m/s^2. What is the mass on the other side of the pulley?

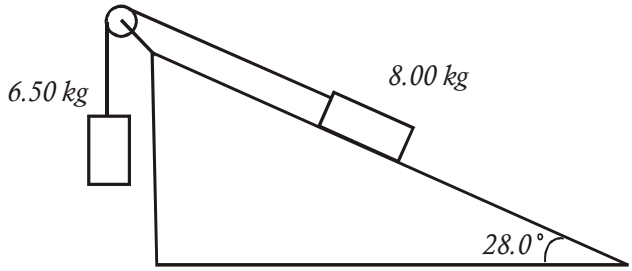


4. A disturbing weight hangs suspended as shown in the drawing. Find the tensions in the two strings.

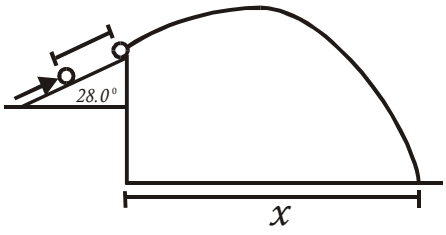


5. An inclined plane has an 8.00 kg mass resting on it. The plane makes an angle of 28.0° to the horizontal. The coefficient of kinetic friction is 0.342. A low-mass string is attached to the weight and runs over one of them really good low friction pulley deals where it is attached to a 6.50 kg mass.

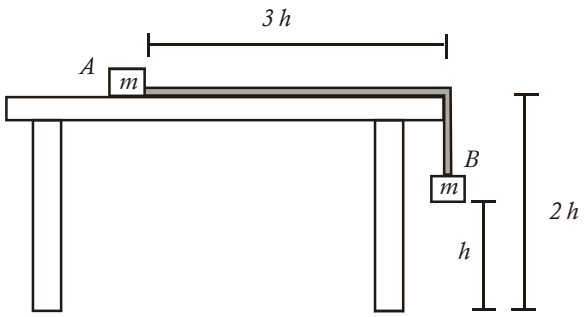
   (a) What is the tension in the string?
   (b) What is the acceleration of the system?
   (c) Does the 8.00 kg mass go down the ramp or up the ramp?



6. A 2.25 kg ball experiences a net force of 965 N up a ramp as shown. Once the ball reaches the top of the ramp, the force no longer acts. The force acts over a distance of 1.50 m on the ramp. Find the horizontal distance x that the ball travels before it hits the deck. The top of the ramp is 4.50 meters above the deck below.



7. Two small blocks, each of mass m, are connected by a string of constant length 4 ***h*** and negligible mass. Block ***A*** is placed on a smooth tabletop as shown and block ***B*** hangs over the edge of the table. The tabletop is a distance 2 ***h*** above the floor. Block B is then released from rest at a distance h above the floor at time $t = 0$.



(a) Determine the acceleration of block ***B*** as it descends.

(b) Block ***B*** strikes the floor and does not bounce. Determine the time t_1 at which block ***B*** strikes the floor.

(c) Describe the motion of block ***A*** from time $t = 0$ to the time when block ***B*** strikes the floor.

(d) Describe the motion of block ***A*** from the time block ***B*** strikes the floor to the time block ***A*** leaves the table.

(e) Determine the distance between the landing points of the two blocks.