Newton's Laws

AP Physics – Mr. Hall

WORKSHEET #7

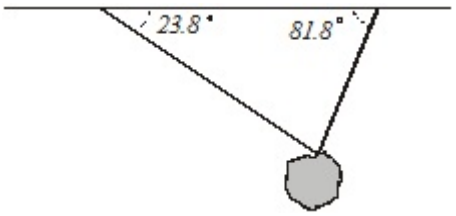
Name: _____

1. A ball is kicked at an angle of 38.0° to the horizontal with a speed of 15.8 m/s. How far does it travel?

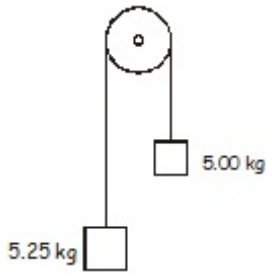
2. What is the mass of a 235 N acrobat?

3. A 25.6 kg rocket accelerates upward at 105 m/s^2. What is the thrust pushing it up?

4. A 12 250 kg boulder hangs from two cables which are at the angles shown. Calculate the tensions in the two cables.

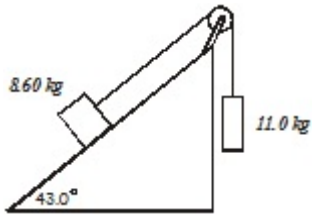


5. Two masses are connected by a light string which passes over a frictionless pulley as shown. (a) What is the acceleration of the system? (b) What are the tensions in the string?



6. You pull on a 98.0 kg bag of wild bird seed and drag it across the deck. If the coefficient of kinetic friction for the bag on the deck is 0.445, what force must you apply to move the thing at a constant speed?

7. Find the acceleration of the system shown in the drawing if the coefficient of kinetic friction between the 7.00 kg mass and the plane is 0.280.



8. A retired policewoman pushes on a 77.2 kg crate with a pole. The pole makes an angle of 32.0° to the horizontal. The coefficient of kinetic friction for the crate and the deck is 0.350. The policewoman exerts a force of 535 N. What is the acceleration of the crate?

9. Why do all objects fall at the same speed (ignoring air resistance)?

10. The first law says that no force is required to maintain motion. Fine, then how come you have to keep pedaling your bicycle to keep it moving?

11. What is the difference between mass and weight?

12. Explain, in terms of Newton's laws, the magician's trick of pulling a tablecloth out from under a bunch of dishes and cups and stuff without disturbing them.

13. What net force is required to accelerate a 135 000 kg aircraft from rest to a speed of 35.0 m/s in 11.0 s?

14. A wise guy you know poses this problem to you: "A horse pulls on a cart, exerting a force on it. The cart exerts an equal and opposite force on the horse. So if the forces are equal, then the net force is zero and the horse cannot pull the cart." What is wrong about this set of particulars? (*i.e.* why ***can*** the horse pull the cart?)