Honors Physics F=ma HW, part 1 (Homework)

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Include file name: Physics_Worksheet_0047
Price: $3

1.
A 5 kg object undergoes an acceleration of 1.8 m/s^2.
(a) What is the magnitude of the resultant force acting on it?
(b) If this same force is applied to a 6 kg object, what acceleration is produced?

2.
A bag of sugar weighs 7.00 lb on Earth. What should it weigh in newtons on the Moon, where the acceleration due to gravity is 1/6 that on Earth?
Repeat for Jupiter, where *g* is 2.64 times Earth gravity.
Find the mass in kilograms at each of the three locations.

3.
The air exerts a forward force of 13 N on the propeller of a 0.10 kg model airplane. If the plane accelerates forward at 3.0 m/s^2, what is the magnitude of the resistive force exerted by the air on the airplane?

4.
A boat moves through the water with two forces acting on it. One is a 1700 N forward push by the motor, and the other is an 1200 N resistive force due to the water.
(a) What is the acceleration of the 800 kg boat?
(b) If it starts from rest, how far will it move in 5.0 s?
(c) What will its velocity be at the end of this time?

5.
The force of the wind on the sails of a sailboat is 330 N north. The water exerts a force of 240 N east. If the boat (including crew) has a mass of 300 kg, what are the magnitude and direction of its acceleration?
Magnitude:
Direction:

6.
Find the tension in each cable supporting the 680 N cat burglar in Figure P4.11. Assume the angle θ of the inclined cable is 32.0° .
Inclined Cable:
Horizontal Cable:
Vertical Cable:

Figure P4.11.

7.

A 162 N bird feeder is supported by three cables, as shown in Figure P4.13. Find the tension in each cable. (See figure next page.)

Right Cable Tension:

Left Cable Tension:

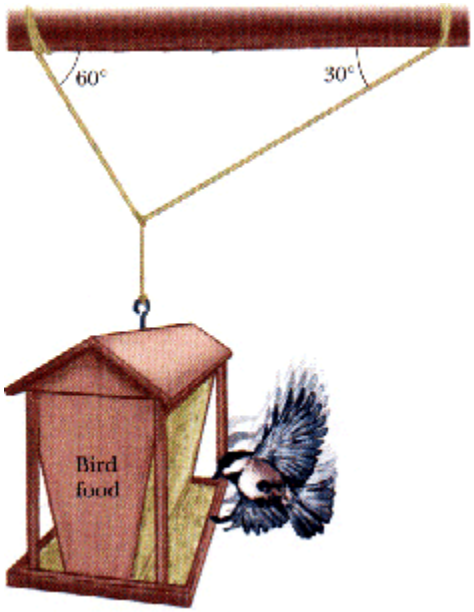

Figure P4.13.

8.

A block of mass m = 2.0 kg is held in equilibrium on an incline of angle θ = 40° by the horizontal force **F**, as shown in Figure P4.15. (ignore friction)

(a) Determine the value of F.

(b) Determine the normal force exerted by the incline on the block.

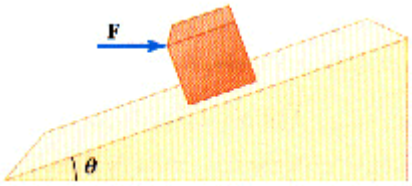

Figure P4.15.

9.
A 3.3 kg bucket of water is raised from a well by a rope. If the upward acceleration of the bucket is 3.0 m/s^2, find the force exerted by the rope on the bucket.

10.
Assume that the three blocks in Figure P4.21 move on a frictionless surface and that a F = 44 N force acts as shown on the m = 3.0 kg block.

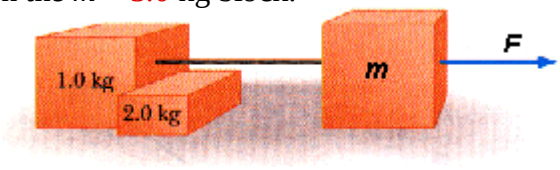

Figure P4.21.

(a) Determine the acceleration given this system.
(b) Determine the tension in the cord connecting m and the 1.0 kg blocks.
(c) Determine the (magnitude of the) force exerted on the 2.0 kg block by the 1.0 kg block.