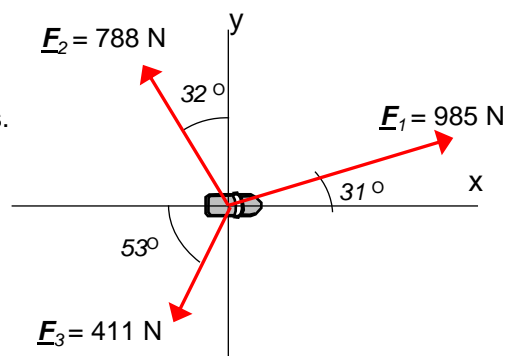


**class problems - chapter 4**

**Problem 1)**

Workmen are trying to free an SUV stuck in the mud. To extricate the vehicle, they use three horizontal ropes producing the force vectors shown.

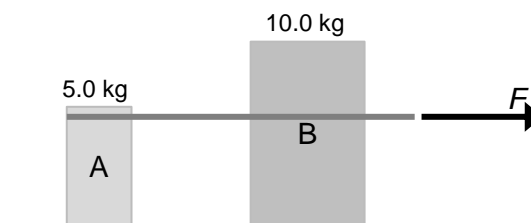
- Find the x- and y- components of the each of the three pulls.
- Use the components to find the magnitude and direction of the resultants of the three pulls.



**Problem 2)**

A person pulls on crate B, which in turn is connected to crate A by a light rope. The light rope remains taut. If the two crate are accelerating to the right, which is greater: the force that B exerts on A, or the force that A exerts on B? Ignore friction forces.

- The force of B on A is greater.
  - The force of A on B is greater.
  - Both forces are the same
  - Depends on magnitude of F.
  - Not enough information.
- Explain for full credit.

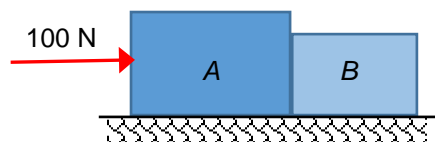


**Problem 3)**

A 68.5-kg skater moving initially at 2.40 m/s on rough horizontal ice comes to rest in 3.52 s due to friction from the ice. What force does friction exert on the skater.

**Problem 4)**

Boxes A and B are in contact on a horizontal, frictionless surface. Box A has mass of 20.0 kg and Box B has mass of 5.0 kg. A horizontal force of 100 N is exerted on box A. What is the magnitude of the force that box A exerts on box B?



**Problem 5)**

An advertisement claims that a particular automobile can "stop on a dime." What net force would actually be necessary to stop a 850-kg automobile traveling initially at 45.0 km/h in a distance equal to the diameter of a dime, which is 1.8 cm?

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**Problem 6)**

The position of a  $2.75 \times 10^3$  - N training helicopter under test is given by:

$$\underline{r} = (0.020 \text{ m/s}^3) t^3 \underline{i} + (2.2 \text{ m/s}) t \underline{j} - (0.060 \text{ m/s}^2) t^2 \underline{k}$$

Find the net force on the helicopter at  $t = 5.0$  s.

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**Problem 7)**

At the surface of Jupiter's moon  $Io$ , the acceleration due to gravity is  $g = 1.81 \text{ m/s}^2$ .

A watermelon weighs 44.0 N at the surface of the earth.

- a) What is the watermelon's mass on the earth's surface?
- b) What is the mass and weight on the surface of  $Io$ .