

Name \_\_\_\_\_  
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## UBF Review Problems

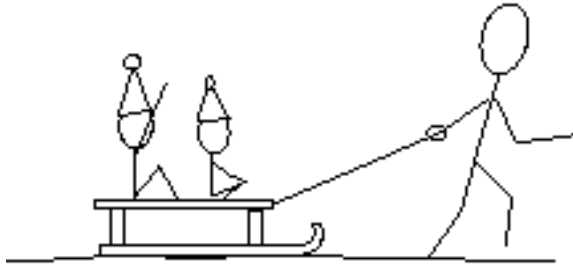
1. An 80 kg water skier is being pulled by a boat with a force of 220 N causing the skier to accelerate at  $1.8 \text{ m/s}^2$ . Find the drag force on the skier.

2. A 2000 kg car is slowed down uniformly from 20 m/s to 5 m/s in 4 seconds. Determine the average net force on the car during this time, and how far the car traveled while slowing down.

3. Some baseball pitchers are capable of throwing a fastball at 100 mi/hr (44.7 m/s). The pitcher achieves this speed by moving his arm through a distance of 1.5 m. Determine the net force that must be exerted on the 0.15 kg ball during the pitch.

4. A 0.5 kg ball falls from rest from a height of 30 m. After the bounce, the ball reaches a height of 20 m.
- a. State the givens and unknowns for the ball before the bounce. What is the velocity of the ball right before it hits the ground?
- b. State the givens and unknowns for the ball after the bounce. What is the velocity of the ball right after it hits the ground?
- c. Use what you found in a and b to determine the acceleration and the net force the ground exerts on the ball. The contact between the ball and ground lasted 20 milliseconds. (1000 milliseconds is 1 second)

5. In the diagram below, the cord makes a  $25^\circ$  angle with the horizontal, the mass of the sled and occupants together is 100 kg. The tension in the cord is 120 N and the friction force is 15 N. Find the acceleration of the sled.



6. The 60 kg skier shown below is skiing down a  $35^\circ$  incline with a coefficient of friction is 0.08. Determine the acceleration of the skier.

