Name: _____   Period: _____

Net Force and Acceleration

Draw a free body diagram for each problem. $g = 9.81 m/s^2$

1. A man is trying to lift a bucket by the handle. He can exert a force of 100N upward. The mass of the bucket is 5kg.
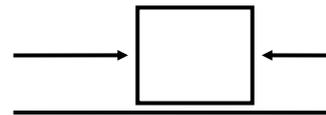
A. What is the weight of the bucket?

B. What is the <u>net force</u> on the bucket?

C. What is the acceleration of the bucket?

2. Two young children are trying to push a 2kg box across the floor, one pushing to the left with a force of 90N and one pushing to the right with 80N of force.

A. What is the net force on the box? <u>(Force is a vector!)</u>

B. What is the acceleration of the box?

C. After 5s what will be the displacement of the box? (Assume the box started from rest.)

3. A LIPA truck is broken down on Old Town road. The truck has a mass of 4,000kg. A class o n a field trip stops to help. The class can pull with a force of 12,000N and the force of friction is 8000 N.
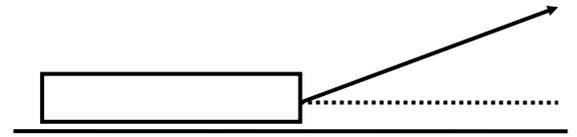
A. What is the weight of the truck?

B. What is the net force on the truck?

C. What is its' acceleration?

4. In the far future, a father pulls his children along on a hover sled. The mass of the sled and the children is 100kg. The tension in the rope is 300N and the rope makes an angle of 30° with the ground. (Assume no friction)
A. Find the net force on the sled in the y direction.

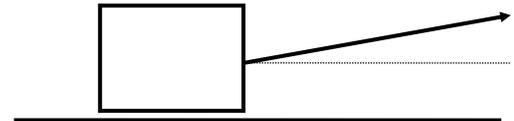B. Find the net force on the sled in the x direction.

C. What is the acceleration in the y direction

D. What is the acceleration in the x direction

5. A 500kg block of metal is dragged across the floor by a rope making an angle of 5° with the horizontal. The tension in the rope is 20,000N and the force of friction is 3000 N
A. Calculate the weight of the block.

B. Calculate the y-component of the tension.

C. Calculate the x-component of the tension.

D. What is the net force in the y direction?

E. What is the net force in the x direction?

F. What is the acceleration in the y direction?

G. What is the acceleration in the x direction?