Physics 100 Name: ______________________________

Practice Test (Forces)

<u>Formulas And Information</u>: $a = \frac{2\Delta x}{t^2}$ $F_{Net} = ma$ $F_{Net} = vector\ sum\ of\ forces$

$w = mg$ 1kg = 1,000g

<u>Quiz 1:</u>

1. (2 pts) Draw a diagram of an object that is experiencing four forces in different directions while experiencing a **net force** of **<u>4N rightward.</u>** Use labeled arrows to show all of the forces.

2. (2 pts) Consider a child pushing a toy car, causing a sideways net force that is accelerating the car.

   a. What will happen if the net force is kept the same, but the car's mass is decreased?

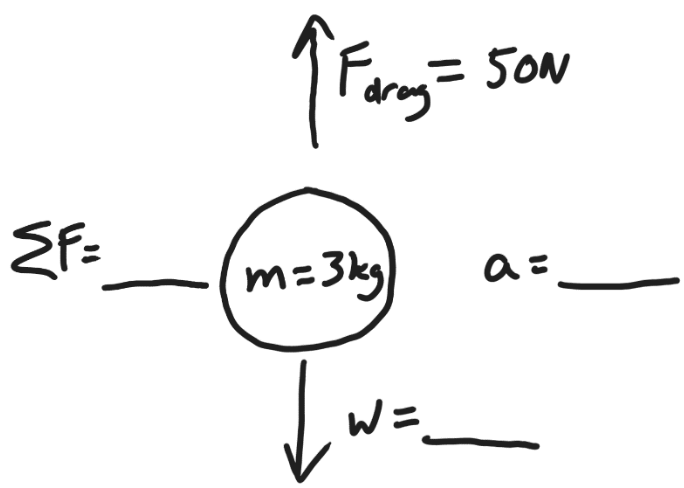
   b. What will happen if the net force is decreased, but the car's mass is kept the same?

3. (2 pts) Describe the action/reaction pairs of forces that are involved in the situations below. Make sure that you name the objects that are experiencing the forces and give the directions of the forces.

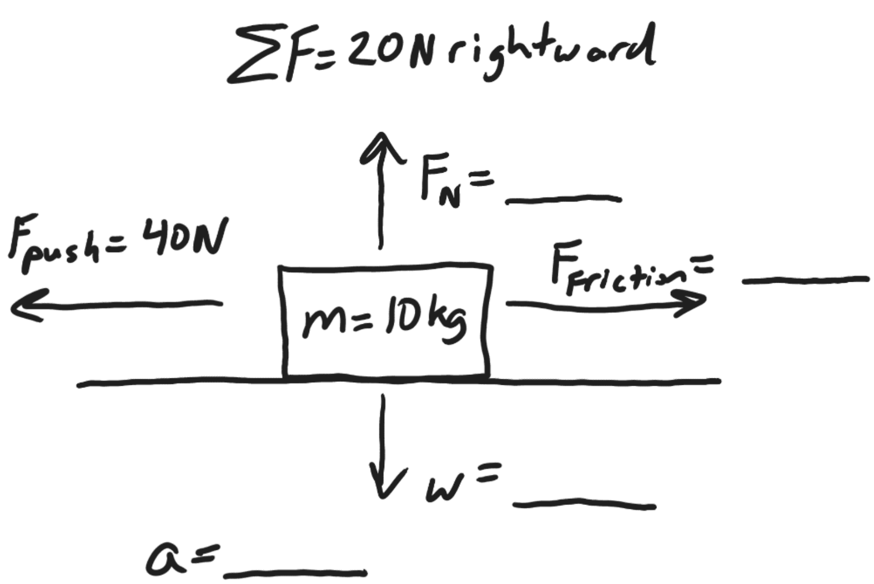
   a. A student climbs up a ladder.

   b. A car drives to our left.

4. (3pts) Fill in the missing forces and acceleration (three blanks) in the diagram below. Make sure that you indicate the correct direction for acceleration.



5. (4pts) Fill in the missing forces and acceleration (in the four blanks) below. The box in the picture is sliding sideways across a table top. It is not moving up or down. Make sure that you indicate the correct direction for acceleration.



Quiz 2:

1. The first table, below, is a timeline detailing a parachuter's descent from a high cliff. Use the timeline and your knowledge of physics to **complete the second table**. **You will only be graded on your answers in the white cells.**

Time	Event
0s	Parachuter steps off of the cliff
10s	Parachuter reaches a first terminal velocity of 60m/s downward.
40s	Parachuter pulls chute cord. Chute deploys.
45s	Parachuter reaches a second terminal velocity of 3m/s downward
600s	Parachuter lands

Don't forget proper units!

Time	Parachuter Mass	Parachuter Weight	Air Resistance (plus direction)	F_{net} (plus direction)	Acceleration (direction)	Speed
0s	60 kg					
4s			200 N Upward			35m/s
30s						
41s			1200N Upward			50m/s
500s						

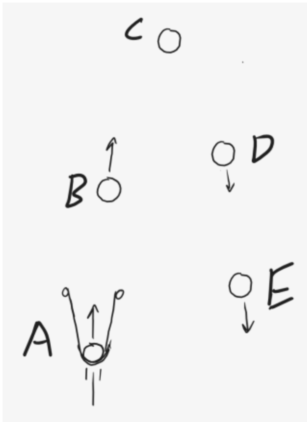
Force Problems and Diagrams: Solve these problems by drawing diagrams showing all of the individual forces.

10. A 10kg box is sliding with a velocity of 2m/s. The box's acceleration is $4m/s^2$. If a person is pushing the block with a force of 55N, what is the force of friction that is acting on the box? **Draw the box and the ground, and all of the forces that are acting on the box. Use the correct names of the forces.**

11. A student has a mass of 50kg. They are standing on a bathroom scale in an elevator, and the elevator is accelerating upward at a rate of $+2m/s^2$. What is the scale's reading? **Draw the student, the elevator, and the scale, and all of the forces that are acting on the student. Use the correct names of the forces.**

Practice Quiz 3

1. A plastic ball is launched directly upward by a slingshot. The boxes below describe moments in the ball's flight. In each box, draw arrows (with names) for all of the individual forces. Also use arrows to show the direction of net force and acceleration. **<u>Do</u> include the force of drag whenever it would be present.**

Stages A-E. 	A. The ball is in the slingshot, being accelerated upward. The slingshot is pushing it upward.
B. The ball is flying upward, free from the slingshot.	C. The ball has reached its high point
D. The ball is falling <u>before</u> reaching terminal velocity.	E. The ball is falling <u>at</u> terminal velocity.

2. A **400g** shuffleboard disk is sitting motionless on smooth, hard, level ground. Then, someone pushes the disk. They push it for a time of **0.8 seconds**. While they are pushing the disk, it slides a distance of **0.7m**. After the push is over, the disk continues sliding for **3.5 seconds**, traveling another **12m** before coming to a **stop**. You can assume that the force of friction is the same during the push and after the push.

a. What is the mass of the disk, in kilograms? _________

b. What is the disk's acceleration while it is being pushed? ________

c. What is the disk's acceleration after the push ends (while it is sliding to a stop)? _______

d. What is the net force acting on the disk while it is being pushed? _______

e. What is the net force acting on the disk after the push ends (while it is sliding to a stop)? _______

f. What is the force of friction that is acting on the disk the whole time? _______

g. What is the force of the push? _______