

$$\Sigma F = ma$$

$$F_{E \text{ on object}} = -9.8 \frac{N}{kg} (mass)$$

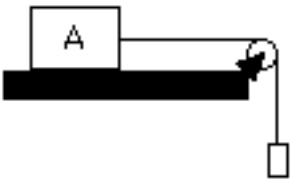

$$F_{friction} = \mu N$$

Name _____

Date _____ Pd _____

UNIT I: Practice Test

For questions 1-2, draw the force diagram and write the ΣF equations to represent the situation. Indicate whether $\Sigma F = 0N$ or $\Sigma F \neq 0N$

<p>1. The weight accelerates block A (object in question) across a frictionless surface.</p> 	
<p>2. A skydiver falls at constant velocity (include air resistance)</p> 	

For each problem below select the best answer for the given situation. A force diagram may be helpful in solving the problem.

3. An elevator is being lifted up an elevator shaft at a constant speed by a steel cable. In this situation, forces on the elevator are such that:
 - a. the upward force by the cable is greater than the downward force of gravity.
 - b. the upward force by the cable is equal to the downward force of gravity.
 - c. the upward force by the cable is smaller than the downward force of gravity.
 - d. the upward force by the cable is greater than the sum of the downward force of gravity and a downward force due to the air.
 - e. none of the above. The elevator goes up because the cable is being shortened, not because an upward force is exerted on the elevator by the cable.

4. A boy throws a metal ball straight up. Consider the motion of the ball only after it has left the boy's hand but before it touches the ground, and assume that forces exerted by the air are negligible. For these conditions, the force(s) acting on the ball is (are):
 - a. a downward force of gravity along with a steadily decreasing upward force.
 - b. a steadily decreasing upward force from the moment it leaves the boy's hand until it reaches its highest point; on the way down there is a steadily increasing downward force of gravity as the object gets closer to the earth.
 - c. an almost constant downward force of gravity along with an upward force that steadily decreases until the ball reaches its highest point; on the way down there is only a constant downward force of gravity.
 - d. an almost constant downward force of gravity only.
 - e. none of the above. The ball falls back to the ground because of its natural tendency to rest on the surface of the earth.

5. A woman exerts a constant horizontal force on a large box. As a result, the box moves across a horizontal floor at a constant speed. The constant force applied by the woman:
- is the same as the weight of the box
 - is greater than the weight of the box
 - has the same magnitude as the total force which resists the motion of the box.
 - is greater than the total force which resists the motion of the box.
 - is greater than either the weight of the box or the total force which resists its motion.

Evaluate each statement below. If the statement is false, explain why it is false.

6. T F If a friction force exerts 10 N and you pull with 50 N, the net force is 60 N.
7. T F When an object is pulled constantly without friction it will move at a constant speed.
8. T F Objects on the moon have the same weight as objects on Earth, as long as they have the same mass.
9. T F A 10- kg mass has a coefficient of kinetic friction of 0.3. The force of kinetic friction is 3 N.
10. T F Inertia is a measure of motion.
11. T F The net force on an object is a sum of all forces acting in all directions.
12. T F A person pushes on a 5 kg box with an acceleration of 2m/s^2 . The net force for the box is 2.5 N.

Show your work Problems

You must show your work as follows: write the equation you plan to use to solve the problem (even if you have used it previously in another part of the problem), plug in your numbers, show your final answer with units.

13. A UPS worker pushes (horizontally and to the right) on a 200 kg box, but it doesn't move.
- Draw a force diagram and write the sum of the forces equation.

b. How much force does the floor exert upward?

c. If the worker exerts 500N of force, how much is the frictional force?

14. A student, standing on a scale in an elevator at rest, sees that her weight is 750 N. When the elevator accelerates upwards the scale reads 950 N.

a. Draw a picture of the situation and make a force diagram.

b. What is the student's mass?

c. What is the acceleration of the elevator as it accelerates upward?