1. Mathematics is used in science because
   (A) with math we can prove scientific laws
   (B) mathematics allow us to use quantified physical measurements
   (C) students don't like mathematics
   (D) scientist are smart

2. A mathematical function
   (A) is normally represented as an equation
   (B) can be visualized as a graph
   (C) is a rule that tells us how to get one quantity if we know another quantity
   (D) all of the above

3. A vector is
   (A) a quantity with direction and magnitude
   (B) also known as a scalar
   (C) a quantity with only magnitude
   (D) something which has no physical meaning.

4. The velocity of an object:
   (A) is the same as the object's speed
   (B) is constant if the object moves in a circle
   (C) depends on the object's mass
   (D) is determined by the object's speed and direction

5. The value of the **average velocity** for any **round trip** is equal to
   (A) zero.
   (B) total distance traveled divided by total trip time.
   (C) the final acceleration multiplied by trip time
   (D) the person's speed halfway through the path.

6. Suppose that the night before your big physics exam you stayed up late watching stand up physics comedians. Sides sore from having laughed too hard you come to class and are in the middle of the test when you get stuck. You are doing a calculation problem and know the answer must have units of velocity and are searching for a possible formula. Which of the following formulas would work for the problem?
   (A) velocity squared x distance
   (B) acceleration / time
   (C) mass / volume
   (D) acceleration x time

7. Suppose an ice skater is moving on the surface of a frozen lake at constant velocity. What is true about the external (outside) forces acting on the skater?
   (A) There are none.
   (B) Gravity can be ignored.
   (C) There could be some but they all cancel out.
   (D) The all are perfectly horizontal.

8. To cause a 25 kg object to experience an acceleration of 2 m/s^2 the net force that needs to be applied to the object is
   (A) 5 N
   (B) 50 N
   (C) 500 N
   (D) 25 N

9. In order to do a positive amount of work you must
   (A) exert a force and just move
   (B) exert a force or move
   (C) change an object's position
   (D) exert a force and move in the direction of the force

10. Which of the following devices on a car can be used to cause the car to accelerate?
    (A) The gas pedal
    (B) The brake pedal
    (C) The steering wheel
    (D) All the above

11. A projectile is thrown directly upward and caught again. At the top of its path
    (A) its horizontal velocity changes
    (B) its acceleration changes
    (C) it stops accelerating
    (D) its vertical velocity is zero

12. Mass
    (A) is a measure of inertia
    (B) is the same as weight.
    (C) is proportional to the square of the acceleration if the total force is fixed.
    (D) is measured in Newtons

13. Your weight and mass are different in that
    (A) your weight is measured in kg but not your mass.
    (B) being weightless means that you have to lose mass.
    (C) your mass depends upon local gravity but your weight does not.
    (D) your weight depends upon local gravity but your mass does not.

14. Suppose you are a football player and you kick a ball for a field goal. Ignoring air resistance, the ball's horizontal velocity
    (A) is maximum at the top of the path
    (B) remains constant throughout the path
    (C) changes throughout the path due to gravitational acceleration
    (D) is zero at the top of the path

15. You kick a soccer ball. Which pushes on the other harder?
    (A) You foot pushes harder on the ball
    (B) The ball pushes harder on your foot
    (C) The ball and your foot push on each other equally hard
    (D) It depends on the ratio of your foot's mass to the mass of the ball.

16. What is the gravitational potential energy of a 40 kg box that is 6m above the ground?
    (use g = 10 m/s^2)
    (A) 2400 J
    (B) 6 J
    (C) 60 J
    (D) 240 J