

Pre-Test for One-Dimensional Motion

1.) Let's say that during a thunderstorm you measure the time lag between the flash and the thunderclap to be 3 seconds. If the speed of sound is about 340 m/s, which of the following is the best estimate of your distance to the lightning bolt?

- a. about 0.3 km
- b. about 1 km
- c. about 3 km
- d. about 10 km

2.) If the average speed of a particle is greater than 0 m/s over some interval of time, which of the following is true.

- a. The instantaneous speed of the particle at some time during the interval could never have been less than 0 m/s.
- b. The instantaneous speed of the particle at some time during the interval must have been equal to 0 m/s.
- c. The instantaneous speed of the particle at some time during the interval could never have been greater than 0 m/s.
- d. The instantaneous speed of the particle at some time during the interval must have been greater than 0 m/s.

3.) Under which of the following conditions is the magnitude of the average velocity of a particle moving in one dimension smaller than the average speed over the time interval?

- a. A particle moves in the + x direction without reversing.
- b. A particle moves in the - x direction without reversing.
- c. A particle moves in the + x direction and then reverses the direction of its motion.
- d. There are no conditions for which this is true.

4. If a car is traveling eastward and slowing down, what is the direction of the acceleration on the car that causes it to slow down?

- a. Eastward
- b. Westward
- c. No acceleration is required to slow the car.
- d. None of these choices.

5. Which of the following is true?

- a. If a car is traveling eastward, its acceleration is eastward.
- b. If a car is slowing down, its acceleration must be negative.
- c. A moving car with constant acceleration can never stop and stay stopped.
- d. If a car is speeding up, its acceleration must be greater than 0.

6. For motion in a straight line under constant acceleration in the x-direction, which of the following determines the positive directions for displacement, velocity, and acceleration?

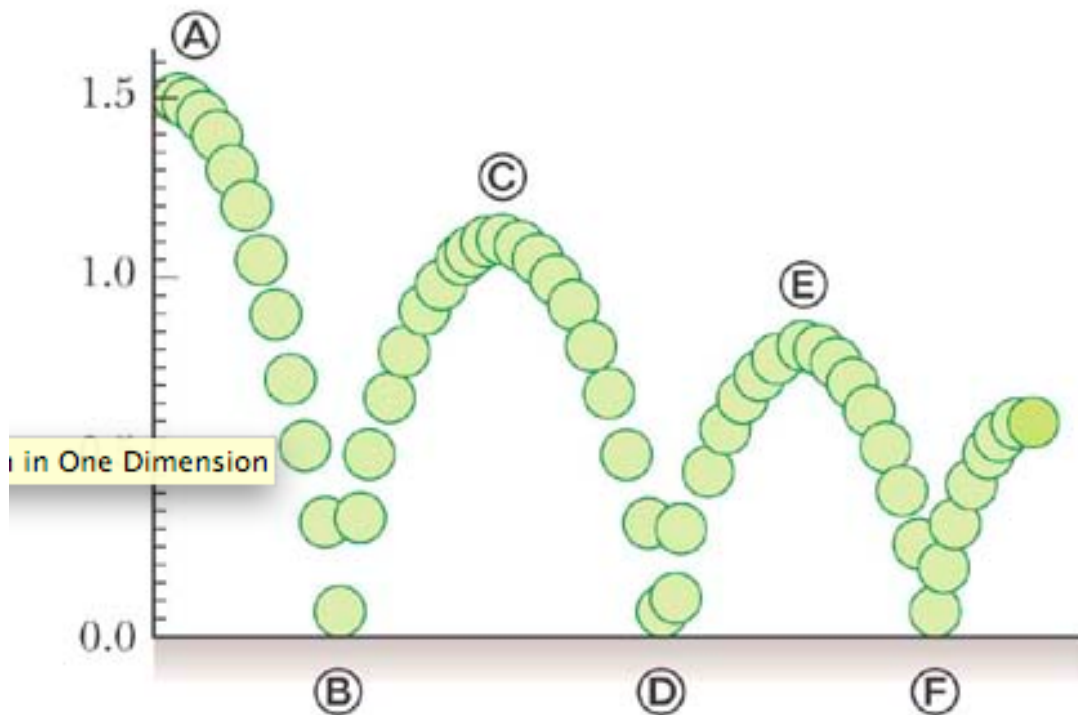
- a. the initial velocity
- b. the initial acceleration
- c. the positive direction of the x-axis
- d. Each of the listed quantities may have its positive direction chosen independently of each other.

7.) A ball is thrown upward. After the ball is released upward and is in the air, its acceleration

- a. increases.
- b. increases and then decreases.
- c. decreases and then increases.
- d. remains the same.

8. A ball is thrown upward. After the ball is released upward and is in the air, its speed

- a. increases.
- b. increases and then decreases.
- c. decreases and then increases.
- d. remains the same.



9. Taking up as positive, which values represent the ball's vertical velocity and acceleration at points A, C, and E in the figure?

- a. $v = 0$, $a = -9.80$ m/s.
- b. $v = 0$, $a = 9.80$ m/s.
- c. $v = 0$, $a = 0$.
- d. $v = -9.80$ m/s, $a = 0$.

10.. Which of the following is **not** true?

- a. The instantaneous velocity of a particle can be greater than its average velocity.
- b. The instantaneous velocity of a particle can be less than its average velocity.
- c. If the average velocity of a particle over some interval is equal to zero, the instantaneous velocity of the particle over that interval may not be equal to zero at any time during the interval.
- d. If the average velocity of a particle over some interval is equal to zero, the instantaneous velocity of the particle over that interval must be equal to zero at some time during the interval.

11. The velocity and acceleration of an object.

- a. can have opposite sign.
- b. must have opposite sign.
- c. must have the same sign.
- d. must both be zero simultaneously, one cannot be zero and the other nonzero.

12. The equations of kinematics, which are given in [Table 2.4](#),

- a. can be used in any situation.
- b. cannot be used if the acceleration is equal to 0.
- c. cannot be used if the acceleration varies with time.
- d. None of these choices are correct.

13. Jordan throws a marble upward with a speed v while Marisa drops a marble at the same instant. While they are in flight, which of the following is true?

- a. Jordan's marble has a greater acceleration than does Marisa's.
- b. Marisa's marble has a greater acceleration than does Jordan's.
- c. They have the same acceleration.
- d. Cannot tell from the information given.

14. Ball A is thrown up and Ball B is thrown down, both with the same initial speed. Neglecting air resistance, just prior to hitting the ground, which of the following is true?

- a. Ball A's speed is greater than Ball B's speed.
- b. Ball B's speed is greater than Ball A's speed.
- c. They have the same speed.
- d. You cannot tell which has the greater speed because it depends on the value of the initial speed.

15. An object falls freely from a height, H . It is released at $t = 0$ and strikes the ground at $t = T$. Consider the time at which the object is at a height of $H/2$. Also consider the height at which the object is located at the time $T/2$. Which of the following is true?

- a. When the object is at a height $H/2$, the time is less than $T/2$ and when the time is $T/2$, the object is at a height of less than $H/2$.
- b. When the object is at a height $H/2$, the time is greater than $T/2$ and when the time is $T/2$, the object is at a height of more than $H/2$.
- c. When the object is at a height of $H/2$, the time is equal to $T/2$.
- d. One cannot tell which of these choices may be true from given information.

16. You drop a ball from a window on an upper floor of a building. It strikes the ground with speed v . You now repeat the drop, but you have a friend down on the street who throws another ball upward at speed v . Your friend throws the ball upward at exactly the same time that you drop yours from the window. At some location, the balls pass each other. Which of the following is true?

- a. This location is below the halfway point between the window and the ground.
- b. This location is above the halfway point between the window and the ground.
- c. This location is at the halfway point between the window and the ground.
- d. One cannot tell which of these choices is correct from information given.

Solution: b, d, c, b, c, c, d, c, a, c, a, c, c, c, b, b