

Question 1

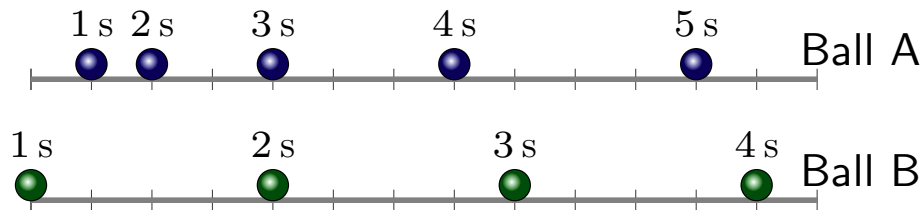
A skateboarder, Alice, slides in a straight line along a horizontal surface with constant speed. She initially holds a ball (not moving compared to her) and then launches it, pushing vertically upward. Alice's velocity stays the same throughout. The situation is viewed by Bob, standing at rest on the ground. Bob focuses on the ball.

Which of the following is true? Ignore air resistance.

1. The basketball will land back in Alice's hands.
2. The basketball will land in front of Alice's hands.
3. The basketball will land behind Alice's hands.

Question 2

Two balls slide along horizontal surfaces. The positions of the balls are recorded at intervals spaced 1 s apart. These are illustrated in the diagram.

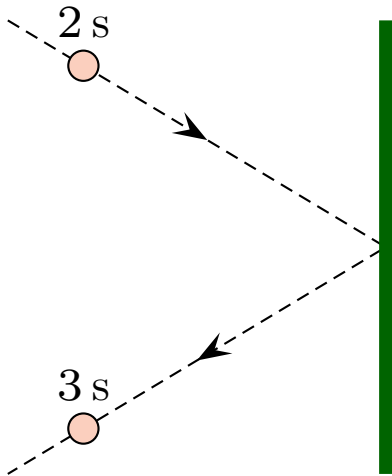


During the illustrated period, which of the following is true?

1. The acceleration of ball A is the same as the acceleration of ball B.
2. The acceleration of ball A is larger than the acceleration of ball B.
3. The acceleration of ball A is smaller than the acceleration of ball B.

Question 3

A pool ball bounces off the side of the table, following the indicated path. The side of the table is made from a special material so that the ball bounces off with the same speed - the speed of the ball is the same throughout. The positions of the ball at two instants are illustrated.



Which of the following is true for the period between ?

1. The acceleration of the ball from 2 s to 3 s is exactly 0 m/s^2 .
2. The acceleration of the ball from 2 s to 3 s is not 0 m/s^2 .

Question 4

During some interval, various objects move as described:

- A. A ball which swings around in a circle at constant speed.
- B. A ball that is dropped to the floor.
- C. A ball that is thrown upward.

For which of these is the acceleration exactly zero at all times during the interval?

- 1. None of them.
- 2. Only A.
- 3. Only B.
- 4. Only C.
- 5. Only A and B.
- 6. Only A and C.