Short Answer

2.1 Relative Motion, Distance, and Displacement   38.

While standing on a sidewalk facing the road, you see a bicyclist passing by toward your right. In the reference frame of the bicyclist, in which direction are you moving?

  a. in the same direction of motion as the bicyclist
  b. in the direction opposite the motion of the bicyclist
  c. stationary with respect to the bicyclist
  d. in the direction of velocity of the bicyclist

39.

Maud sends her bowling ball straight down the center of the lane, getting a strike. The ball is brought back to the holder mechanically. What are the ball's net displacement and distance traveled?

  a. Displacement of the ball is twice the length of the lane, while the distance is zero.
  b. Displacement of the ball is zero, while the distance is twice the length of the lane.
  c. Both the displacement and distance for the ball are equal to zero.
  d. Both the displacement and distance for the ball are twice the length of the lane.

40.

A fly buzzes four and a half times around Kit Yan's head. The fly ends up on the opposite side from where it started. If the diameter of his head is $14\,\text{cm}$, what is the total distance the fly travels and its total displacement?

  a. The distance is $63\pi\,\text{cm}$ with a displacement of zero.
  b. The distance is $7\,\text{cm}$ with a displacement of zero.
  c. The distance is $63\pi\,\text{cm}$ with a displacement of $14\,\text{cm}$.
  d. The distance is $7\,\text{cm}$ with a displacement of $63\pi\,\text{cm}$.

2.2 Speed and Velocity   41.

Rob drove to the nearest hospital with an average speed of v m/s in t seconds. In terms of t, if he drives home on the same path, but with an average speed of 3v m/s, how long is the return trip home?

  a. t/6
  b. t/3
  c. 3t
  d. 6t

42.

What can you infer from the statement, *Velocity of an object is zero*?

a. Object is in linear motion with constant velocity.
b. Object is moving at a constant speed.
c. Object is either at rest or it returns to the initial point.
d. Object is moving in a straight line without changing its direction.

43.

An object has an average speed of 7.4 km/h. Which of the following describes two ways you could increase the average speed of the object to 14.8 km/h?

a. Reduce the distance that the object travels by half, keeping the time constant, or keep the distance constant and double the time.
b. Double the distance that the object travels, keeping the time constant, or keep the distance constant and reduce the time by half.
c. Reduce the distance that the object travels to one-fourth, keeping the time constant, or keep the distance constant and increase the time by fourfold.
d. Increase the distance by fourfold, keeping the time constant, or keep the distance constant and reduce the time by one-fourth.

44.

Swimming one lap in a pool is defined as going across a pool and back again. If a swimmer swims 3 laps in 9 minutes, how can his average velocity be zero?

a. His average velocity is zero because his total distance is zero.
b. His average velocity is zero because his total displacement is zero.
c. His average velocity is zero because the number of laps completed is an odd number.
d. His average velocity is zero because the velocity of each successive lap is equal and opposite.

2.3 Position vs. Time Graphs   45.

A hockey puck is shot down the arena in a straight line. Assume it does not slow until it is stopped by an opposing player who sends it back in the direction it came. The players are 20 m apart and it takes 1 s for the puck to go there and back. Which of the following describes the graph of the displacement over time? Consider the initial direction of the puck to be positive.

a. The graph is an upward opening V.
b. The graph is a downward opening V.
c. The graph is an upward opening U.
d. The graph is downward opening U.

46.

A defensive player kicks a soccer ball 20 m back to her own goalie. It stops just as it reaches her. She sends it back to the player. Without knowing the time it takes, draw a rough sketch of the displacement over time. Does this graph look similar to the graph of the hockey puck from the previous question?

a. Yes, the graph is similar to the graph of the hockey puck.
b. No, the graph is not similar to the graph of the hockey puck.
c. The graphs cannot be compared without knowing the time the soccer ball was rolling.

47.

What are the net displacement, total distance traveled, and total average velocity in the previous two problems?

a. net displacement = 0 m, total distance = 20 m, total average velocity = 20 m/s
b. net displacement = 0 m, total distance = 40 m, total average velocity = 20 m/s
c. net displacement = 0 m, total distance = 20 m, total average velocity = 0 m/s
d. net displacement = 0 m, total distance = 40 m, total average velocity = 0 m/s

48.

Describe the graph of a bee's motion if it leaves its hive in the positive direction, slows to visits a flower, then speeds up to return to the hive along the same path.

a. The graph would take the shape of a v with the point down.
b. The graph would take the shape of a v with the point up.
c. The graph would take the shape of a parabola with the legs pointing up.
d. The graph would take the shape of a parabola with the legs pointing down.

2.4 Velocity vs. Time Graphs   49.

What would the velocity vs. time graph of the object whose position is shown in the graph look like?

Position vs. Time
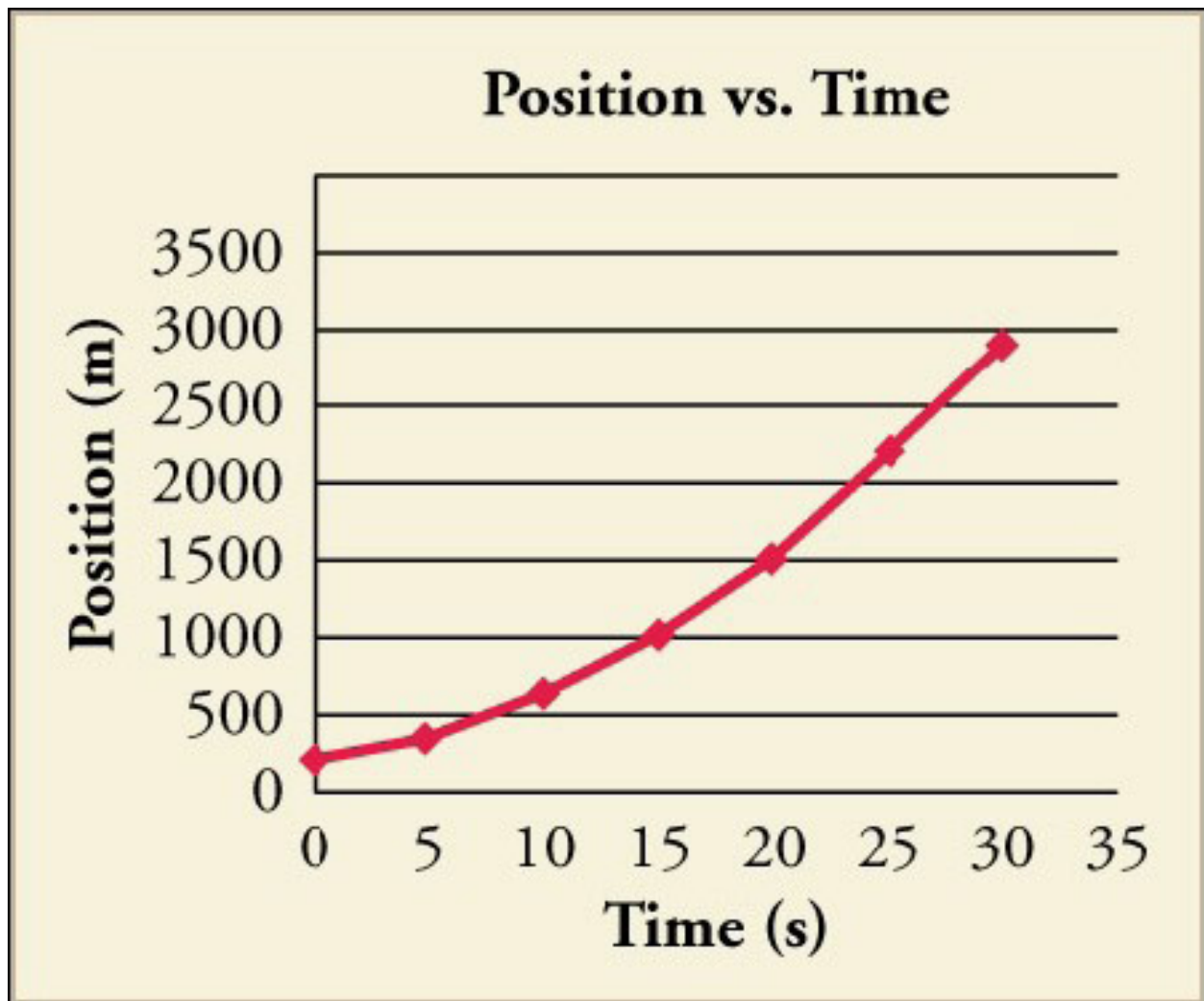
a. It is a straight line with negative slope.
b. It is a straight line with positive slope.
c. It is a horizontal line at some negative value.
d. It is a horizontal line at some positive value.

50.

Which statement correctly describes the object's speed, as well as what a graph
of acceleration vs. time would look like?

Velocity vs. Time
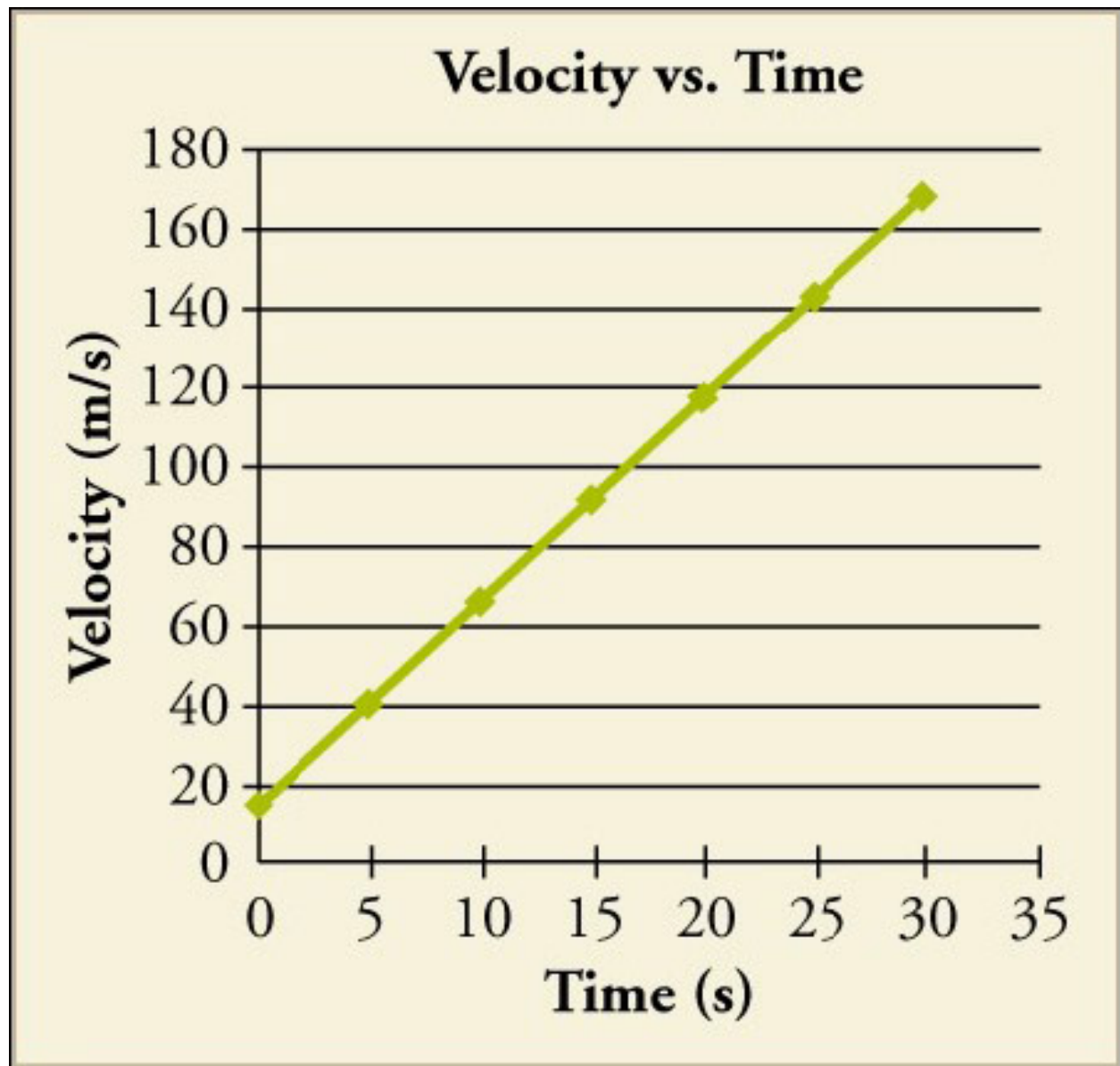
a. The object is not speeding up, and the acceleration vs. time graph is a horizontal line at some negative value.
b. The object is not speeding up, and the acceleration vs. time graph is a horizontal line at some positive value.
c. The object is speeding up, and the acceleration vs. time graph is a horizontal line at some negative value.
d. The object is speeding up, and the acceleration vs. time graph is a horizontal line at some positive value.
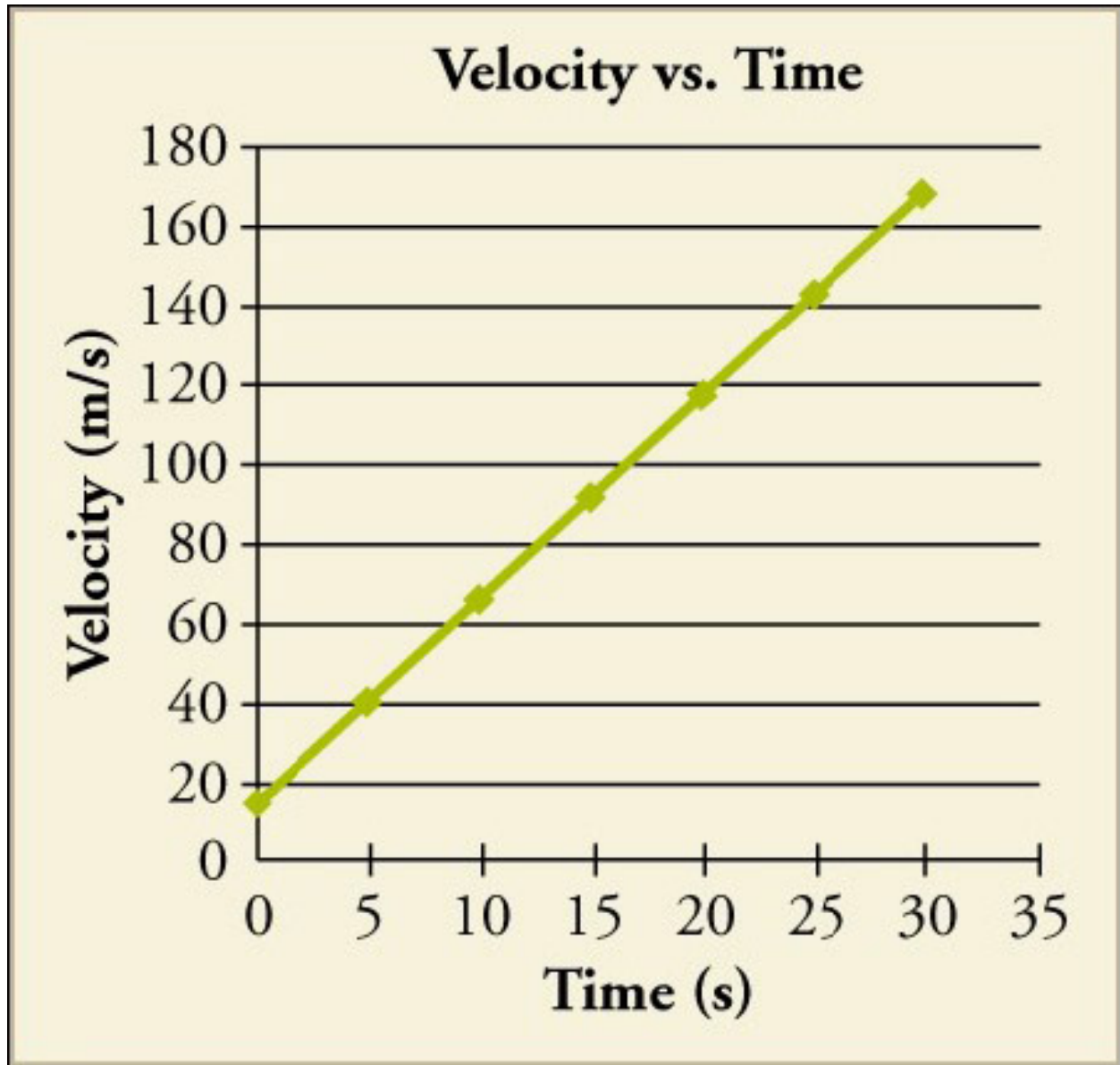
51.

Calculate that object's net displacement over the time shown.
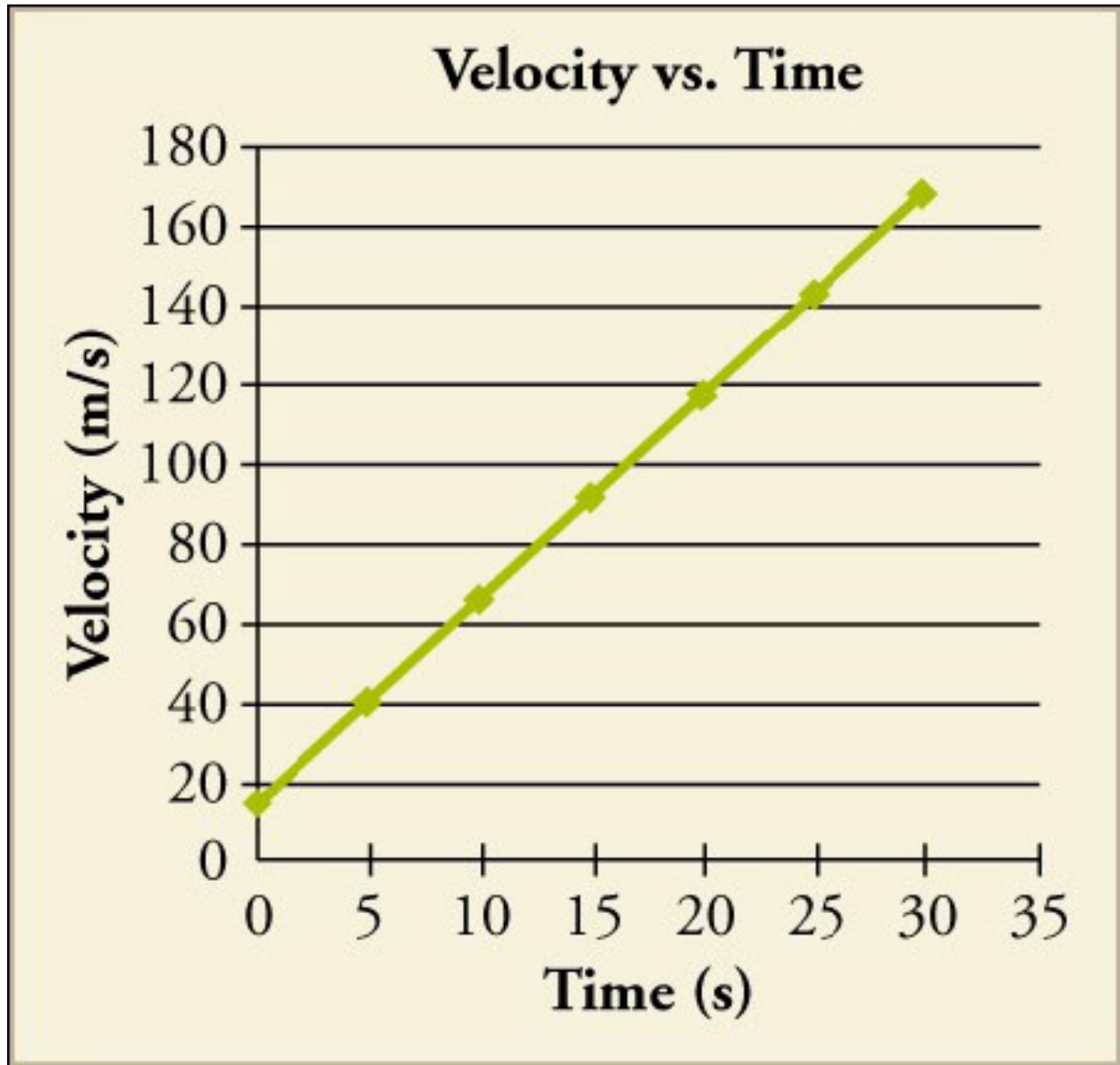
a. 540 m
b. 2,520 m
c. 2,790 m
d. 5,040 m

52.

What is the object's average velocity?

a. 18 m/s
b. 84 m/s
c. 93 m/s
d. 168 m/s