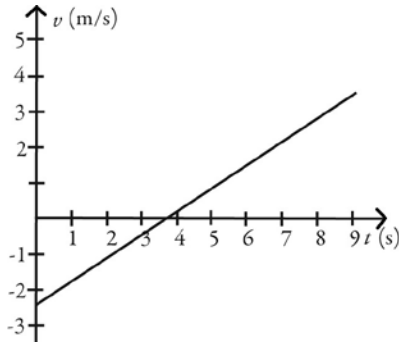


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Principles & Practice of Physics (Mazur)
Chapter 2 Motion in One Dimension

2.1 Conceptual Questions

1) The motion of a particle is described in the velocity versus time graph shown in the figure. We can say that its speed

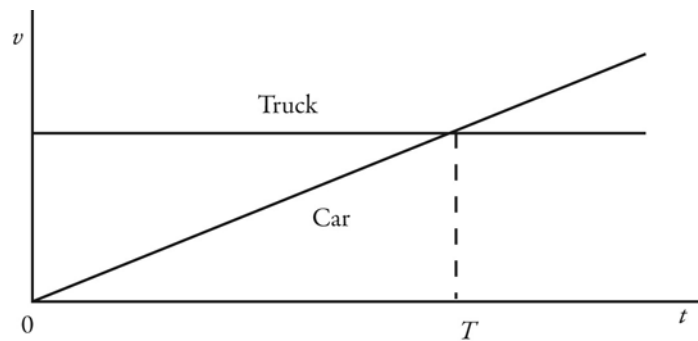


- A) increases.
- B) decreases.
- C) increases and then decreases.
- D) decreases and then increases.

Answer: D

Var: 1

2) The motions of a car and a truck along a straight road are represented by the velocity-time graphs in the figure. The two vehicles are initially alongside each other at time $t = 0$. At time T , what is true about these two vehicles since time $t = 0$?



- A) The truck will have traveled further than the car.
- B) The car will have traveled further than the truck.
- C) The truck and the car will have traveled the same distance.
- D) The car will be traveling faster than the truck.

Answer: A

Var: 1

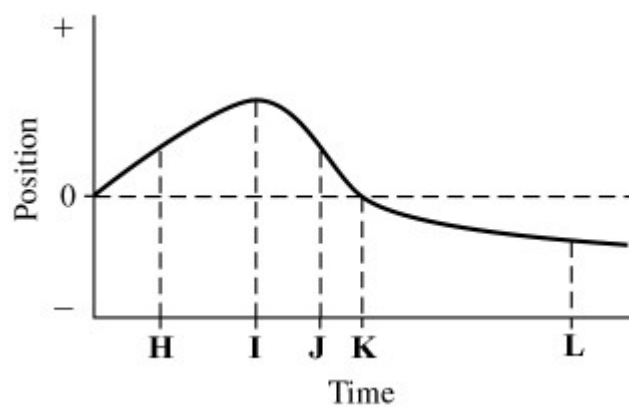
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3) The graph in the figure shows the position of an object as a function of time. The letters H-L represent particular moments of time. At which moments shown (H, I, etc.) is the speed of the object

(a) the greatest?

(b) the smallest?



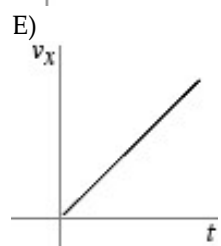
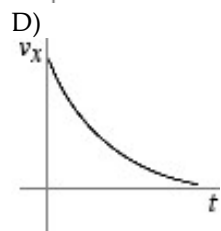
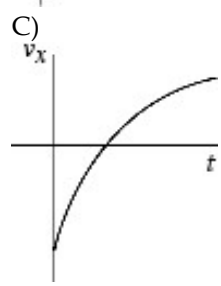
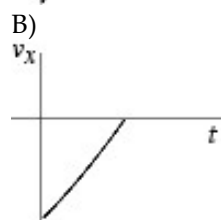
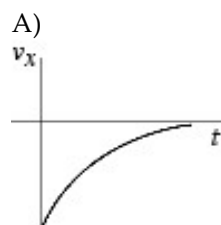
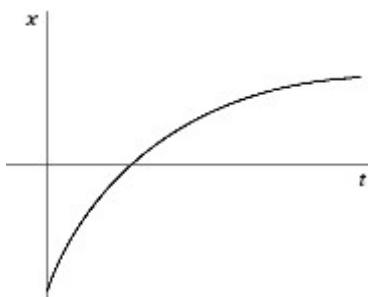
Answer: (a) J (b) I

Var: 1

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4) The figure shows the graph of the position x as a function of time for an object moving in the straight line (the x -axis). Which of the following graphs best describes the velocity along the x -axis as a function of time for this object?



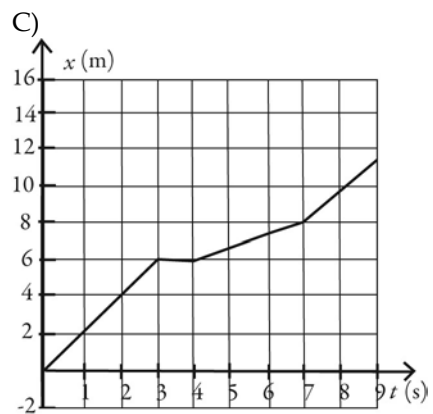
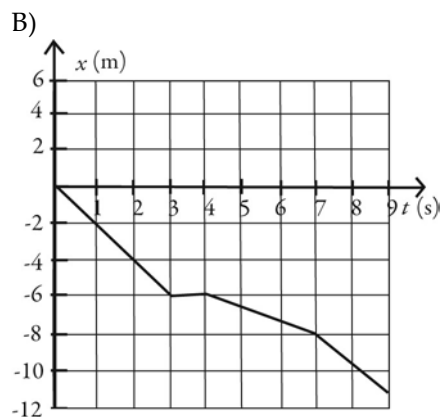
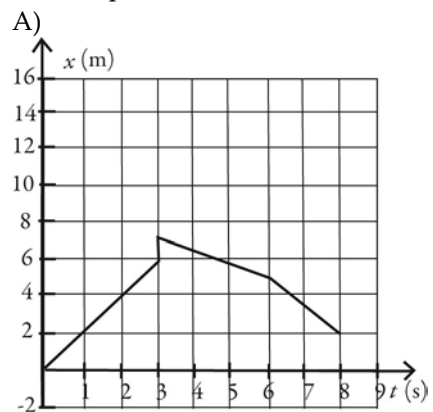
Answer: D

Var: 1

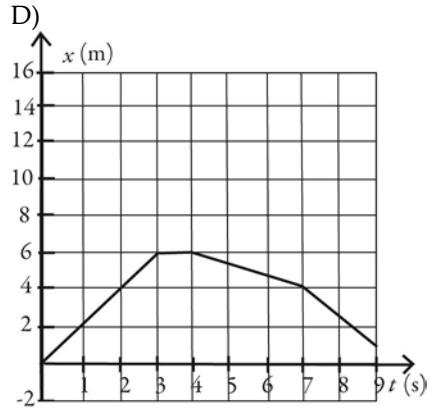
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5) An object starts its motion with a constant velocity of 2.0 m/s toward the east. After 3.0 s, the object stops for 1.0 s. The object then moves toward the west a distance of 2.0 m in 3.0 s. The object continues traveling in the same direction, but increases its speed by 1.0 m/s for the next 2.0 s. Which graph below could represent the motion of this object?



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Answer: D

Var: 1

2.2 Problems

1) A cat runs along a straight line (the x -axis) from point A to point B to point C , as shown in the figure. The distance between points A and C is 5.00 m, the distance between points B and C is 10.0 m, and the positive direction of the x -axis points to the right. The time to run from A to B is 20.0 s, and the time from B to C is 8.00 s. As the cat runs along the x -axis between points A and C

(a) what is the magnitude of its average velocity?

(b) what is its average speed?



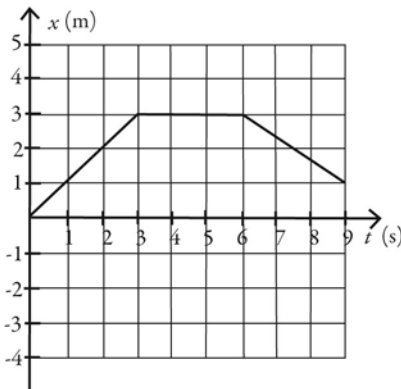
Answer: (a) 0.179 m/s (b) 0.893 m/s

Var: 1

2) The figure shows the position of an object as a function of time. During the time interval from time $t = 0.0$ s and time $t = 9.0$ s

(a) what is the length of the path the object followed?

(b) what is the displacement of the object?



Answer: (a) 5.0 m (b) 1.0 m

Var: 1

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3) As part of an exercise program, a woman walks south at a speed of 2.00 m/s for 60.0 minutes. She then turns around and walks north a distance 3000 m in 25.0 minutes

(a) What is the woman's average velocity during her entire motion?

- A) 0.824 m/s south
- B) 1.93 m/s south
- C) 2.00 m/s south
- D) 1.79 m/s south
- E) 800 m/s south

(b) What is the woman's average speed during her entire motion?

- A) 0.824 m/s
- B) 1.93 m/s
- C) 2.00 m/s
- D) 1.79 m/s
- E) 800 m/s

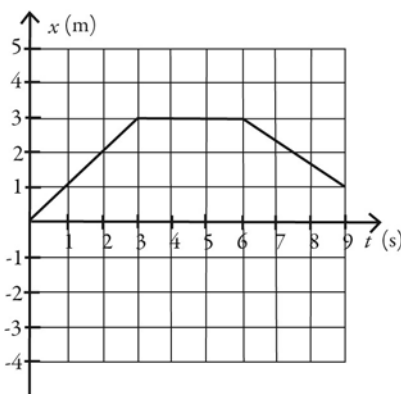
Answer: (a) A (b) C

Var: 1

4) The figure shows the position of an object as a function of time, with all numbers accurate to two significant figures. Between time $t = 0.0$ s and time $t = 9.0$ s

(a) what is the average speed of the object?

(b) what is the average velocity of the object?



Answer: (a) 0.56 m/s (b) 0.11 m/s

Var: 1

5) If the fastest you can safely drive is 65 mi/h, what is the longest time you can stop for dinner if you must travel 541 mi in 9.6 h total?

- A) 1.0 h
- B) 1.3 h
- C) 1.4 h
- D) You can't stop at all.

Answer: B

Var: 50+

6) Arthur and Betty start walking toward each other when they are 100 m apart. Arthur has a speed of 3.0 m/s and Betty has a speed of 2.0 m/s. Their dog, Spot, starts by Arthur's side at the same time and runs back and forth between them at 5.0 m/s. By the time Arthur and Betty meet, what distance has Spot run?

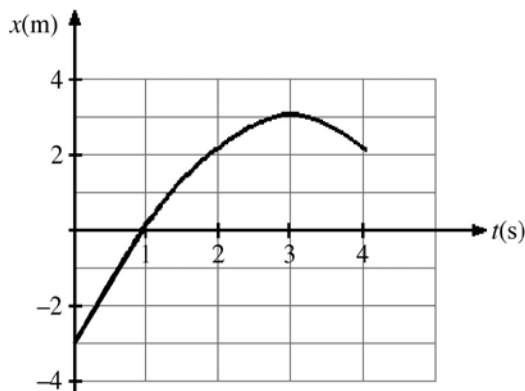
Answer: 100 m

Var: 1

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7) The figure represents the position of a particle as it travels along the x -axis. Between $t = 2$ s and $t = 4$ s, what is (a) the average speed of the particle and (b) the average velocity of the particle?

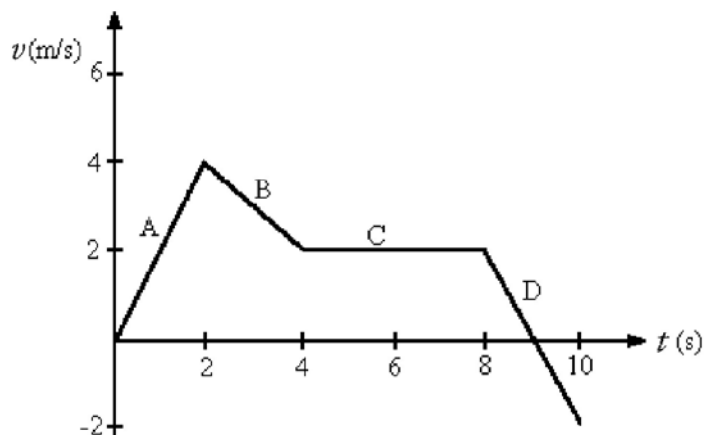


Answer: (a) 1.0 m/s (b) 0.00 m/s

Var: 1

8) The figure shows a graph of the velocity as a function of time for a basketball player traveling up and down the court in a straight-line path. For the 10 s shown on the graph, find

- (a) the net displacement of the player.
 (b) the total distance run by the player.



Answer: (a) 18 m (b) 20 m

Var: 1

9) The position of an object as a function of time is given by $x = bt^2 - ct$, where $b = 2.0$ m/s² and $c = 6.7$ m/s and x and t are in SI units. What is the instantaneous velocity of the object when $t = 2.2$?

- A) 1.7 m/s
 B) 2.1 m/s
 C) 2.3 m/s
 D) 2.7 m/s

Answer: B

Var: 22

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10) The velocity of an object is given by the expression $v(t) = 3.00 \text{ m/s} + (4.00 \text{ m/s}^3)t^2$, where t is in seconds. Determine the position of the object as a function of time if it is located at $x = 1.00 \text{ m}$ at time $t = 0.000 \text{ s}$.

A) $(4.00 \text{ m/s})t + 1.00 \text{ m}$

B) $(3.00 \text{ m/s})t + (1.33 \text{ m/s}^3)t^3$

C) $(4.00 \text{ m/s})t$

D) 1.33 m

E) $1.00 \text{ m} + (3.00 \text{ m/s})t + (1.33 \text{ m/s}^3)t^3$

Answer: E

Var: 5

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