Chapter 2

An object goes from one point in space to another. After it arrives at its destination, its *displacement* is:

A) either greater than or equal to
B) always greater than
C) always equal to
D) either smaller than or equal to
E) always smaller than

the *distance* it traveled.

A car travels in a straight line covering a total distance of 90.0 miles in 60.0 minutes. Which statement concerning this situation is true?

A) The velocity of the car is constant.
B) The acceleration of the car must be non-zero.
C) The first 45 miles must have been covered in 30 minutes.
D) The speed of the car must be 90 miles per hour throughout the entire trip.
E) The average velocity of the car is 90 miles per hour in the direction of motion.

Chapter 2

When is the average velocity of an object equal to the instantaneous velocity?

A) This is always true.

B) This is never true.

C) This is the case when the velocity is constant.

D) This is the case only when the velocity is increasing at a constant rate.

Which physical quantity is not correctly paired with its SI unit and dimension?

Quantity	Unit	Dimension
A) velocity	m/s	[L]/[T]
B) path length	m	[L]
C) speed	m/s	[L]/[T]
D) displacement	m/s^2	$[L]/[T]^2$
E) speed $\times$ time	m	[L]

Chapter 2

Suppose that an object is moving with constant acceleration. Which of the following is an accurate statement concerning its motion?

A) In equal times its speed increases by equal amounts

B) In equal times it velocity changes by equal amounts.

C) In equal times it moves equal distances.

D) None of the above is true.

Starting from rest, a particle that is confined to move along a straight line is accelerated at a rate of 4 m/s^2. After 10 seconds how far will the particle have traveled?

A) 20 m
B) 40 m
C) 100 m
D) 200 m
E) 400 m

Chapter 2

A car starts from rest and accelerates at a constant rate in a straight line. In the *first* second the car covers a distance of 2.0 meters. How much additional distance will the car cover in the *second* second.

A) 2.0 m
B) 4.0 m
C) 6.0 m
D) 8.0 m
E) 12.5 m

Ball **A** is dropped from a window. At the same instant, ball **B** is thrown downward and ball **C** is thrown upward from the same window. Which statement concerning the balls is necessarily true if air resistance is neglected?

A) At one instant, the acceleration of ball **C** is zero.
B) All three balls strike the ground at the same time.
C) All three balls have the same velocity at any instant.
D) All three balls have the same acceleration at any instant.
E) All three balls reach the ground with the same velocity.

Chapter 2

If you drop a brick from a building in the absence of air resistance, it accelerates downward at 9.8 m/s^2. If instead you throw it downward, its downward acceleration after release is

A) less than 9.8 m/s^2

B) 9.8 m/s^2

C) more than 9.8 m/s^2

D) impossible to determine with the information given

A ball is released from rest and falls 100 feet near the surface of the earth. Neglecting air resistance, how long will it take for the ball to fall the 100 feet?

A) 2.50 s
B) 3.12 s
C) 4.50 s
D) 6.25 s
E) 10.0 s

Chapter 2

A ball is thrown straight up from the surface of the earth with an initial speed of 19.6 m/s. Neglecting air resistance, what maximum height will the ball reach before it begins to fall downward?

A) 9.80 m
B) 14.7 m
C) 19.6 m
D) 24.5 m
E) 58.8 m

Two balls are thrown straight up. The first one takes twice as long to return to earth as the second one. Ignore air resistance. How much faster was the first ball thrown?

A) $\sqrt{2}$ times as fast.

B) Twice as fast.

C) Three times as fast.

D) Four times as fast.

E) Impossible to tell without knowing the exact times.

Chapter 2

Two balls are thrown straight up. The first is thrown with twice the initial speed of the second. Ignore air resistance. How much higher will the first ball rise?

A) $\sqrt{2}$ times as high.

B) Twice as high.

C) Three times as high.

D) Four times as high.

E) Eight times as high

Two rocks are dropped into two different deep wells. The first one takes three times as long to hit bottom as the second one. Ignore air resistance. How much deeper is the first well than the second?

A) $\sqrt{3}$ times as deep.

B) Three times as deep.

C) Four and a half times as deep.

D) Six times as deep.

E) Nine times as deep.

Chapter 2

A person standing at the edge of a cliff throws one ball straight up and another ball straight down at the same initial speed. Neglecting air resistance, the ball that hits the ground below the cliff with the greater speed is the one initially thrown

A) upward

B) downward

C) neither, they both hit at the same speed.

D) It is impossible to tell with the information given.

Ball A is dropped from the top of a building. One second later, ball B is dropped from the same building. Neglecting air resistance, as time progresses the *difference* in their speeds

A) increases.

B) remains constant.

C) decreases.

D) depends on the size of the balls.

Chapter 2

Ball A is dropped from the top of a building. One second later, ball B is dropped from the same building. Neglecting air resistance, as time progresses the *distance* between them

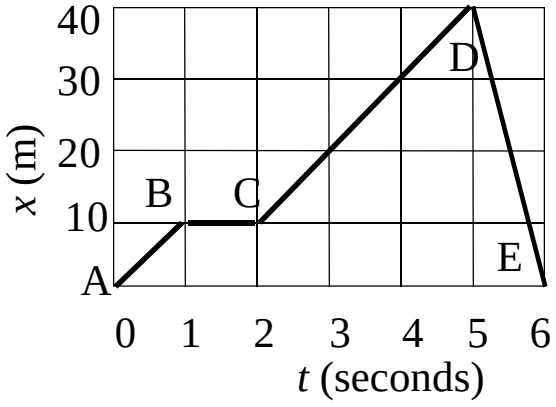
A) increases.

B) remains constant.

C) decreases.

D) depends on the size of the balls.

An object is moving along a straight line. The graph at the right shows its position from the starting point as a function of time.

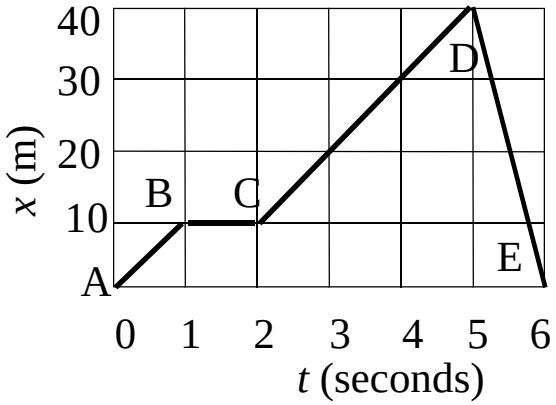


In what section of the graph does the object have the fastest speed?

A) AB
B) BC
C) CD
D) DE
E) AB and CD

Chapter 2

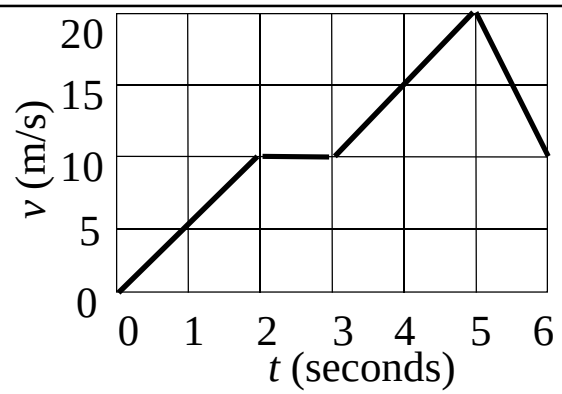
An object is moving along a straight line. The graph at the right shows its position from the starting point as a function of time.



What was the instantaneous velocity of the object at t = 4 seconds?

A) +6.0 m/s
B) +8.0 m/s
C) +10.0 m/s
D) + 13.3 m/s
E) +40 m/s

An object is moving along a straight line. The graph at the right shows its velocity as a function of time.



During which interval(s) of the graph does the object travel ***equal distances in equal times***?

A) 0 to 2 s
B) 2 s to 3 s
C) 3s to 5 s
D) 0 to 2 s and 3 s to 5 s
E) 0 to 2 s, 3 s to 5 s, and 5 s to 6 s

Chapter 2

The graph shows position as a function of time for two trains running on parallel tracks. Which is true:

A) At time t_B both trains have the same velocity.

B) Both trains speed up all the time.

C) Both trains have the same velocity at some time before t_B.

D) Somewhere on the graph, both trains have the same acceleration.