1D Kinematic Items - Master Item List - Active Items

June 2024

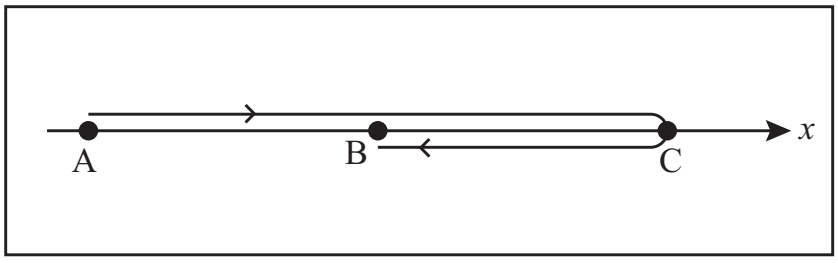
1 Kinematics Assessment

The questions which follow ask about the motion of an object in one dimension. All objects move along the x axis. The positive x axis is to the right of the page. For any vector quantity (acceleration, velocity, etc.), the problem asks about the x component of the vector.

Problem 1: (KD1-1-V3)
An object is initially at the point +2m along the x-axis. The object then moves to the point +1m. What is the displacement of the object?

A. The displacement is 1m.
B. The displacement is 1m in the positive x direction.
C. The displacement is 1m in the negative x direction.
D. The displacement is 2m.
E. The displacement is 2m in the positive x direction.
F. The displacement is 2m in the negative x direction.

Problem 2: (KD1-4)

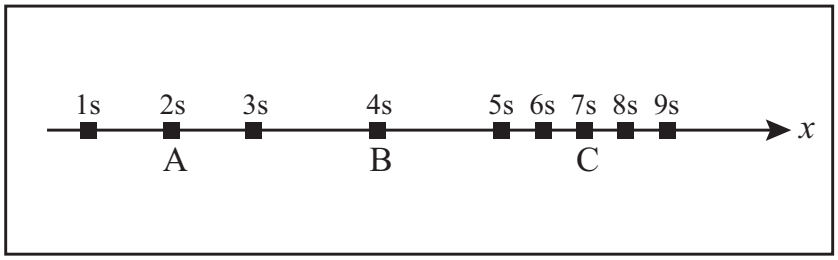


The figure above shows the trajectory of an object that starts at point A, travels to the right until it reaches point C, then reverses direction and travels to the left to point B.

Compare the distance between point A and B to the total distance traveled.

A. The distance between points A and B is equal to the total distance traveled.
B. The distance between points A and B is greater than the total distance traveled.
C. The distance between points A and B is less than the total distance traveled.

Problem 3: (KD1-5-V4EC)

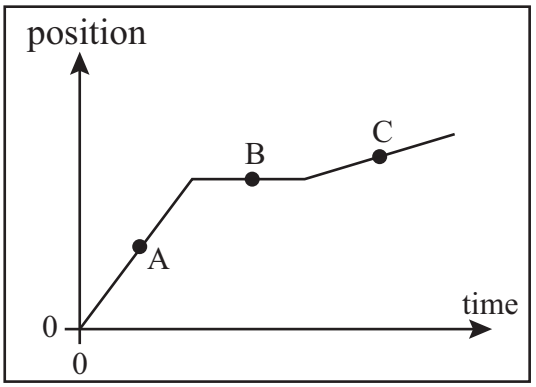


The figure above shows the location of an object moving to the right along the x axis. Each square represents the location at a point in time. The amount of time between each pair of sequential squares is one second.

Select the inequality below which best represents the relation of the average velocity in the x direction, v, at the points A, B, and C.

A. $v_A = v_B = v_C$
B. $v_A > v_B > v_C$
C. $v_C > v_B > v_A$
D. $v_C > v_A > v_B$
E. $v_B > v_A > v_C$

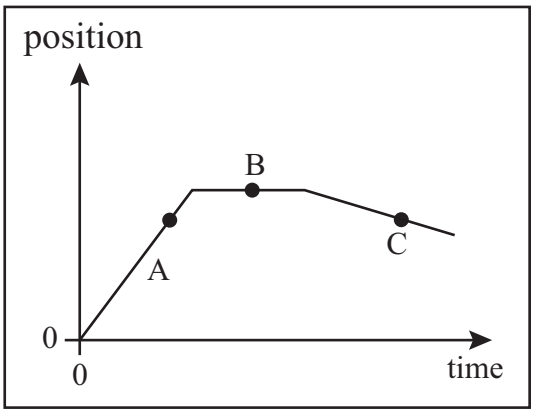
Problem 4: (KD1-6-V3)



An object moves along the x axis. The figure above shows the graph of the position on the x axis as a function of time. Three locations on the plot have been marked. Select the inequality below which best represents the relation of the velocity in the x direction, v, at the points A, B, and C.

A. $v_A = v_B = v_C$
B. $v_A > v_C > v_B$
C. $v_C > v_B > v_A$
D. $v_C > v_A > v_B$
E. $v_B > v_A > v_C$

Problem 5: (KD1-6-V4EC)

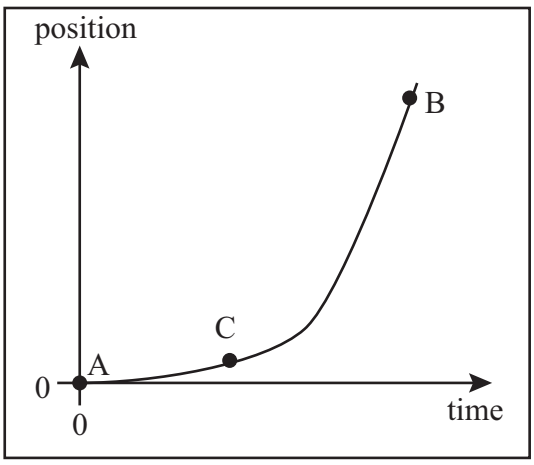


An object moves along the x axis. The figure above shows the graph of the position along the x axis as a function of time. Three positions on the plot have been marked.

Select the inequality below that best represents the relation of v, the velocity in the x direction, at the points A, B, and C.

A. $v_A = v_B = v_C$
B. $v_A > v_C > v_B$
C. $v_A > v_B > v_C$
D. $v_C > v_A > v_B$
E. $v_B > v_A = v_C$

Problem 6: (KD1-7)

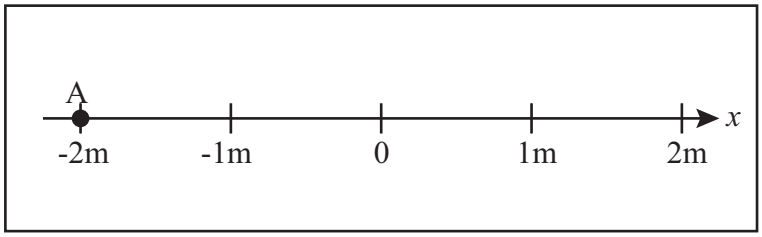


An object moves along the x axis. The figure above shows the graph of the position on the x axis as a function of time. Three locations on the plot have been marked: A, B, and C.

Select the answer which best represents the relation of the velocity at point C and the average velocity between points A and B.

A. The average velocity between point A and B equals the velocity at point C.
B. The average velocity between point A and B is less than the velocity at point C.
C. The average velocity between point A and B is greater than the velocity at point C.

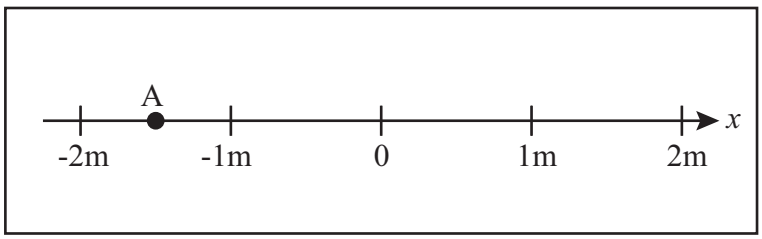
Problem 7: (KD1-8-V3)



An object moves along the x axis. The object is initially at point A, which is at $x = -2$m, as shown in the diagram above. The x component of the velocity is negative and constant. Select the response that best describes the subsequent motion of the object.

A. The object moves to the left.
B. The object moves to the right.
C. The object does not move.
D. The object moves to the right until it reaches the origin, stops, then moves to the left.

Problem 8: (KD1-8-V4EC)



An object moves along the x axis. At time t_A, the object is at point A. The object's position is negative at point A as shown in the figure above. The object has a constant negative velocity.

Select the response that best describes the motion of the object after time t_A.

A. The object moves to the left.
B. The object moves to the left until it reaches the origin and then stops.
C. The object moves to the left until it reaches the origin, stops, then moves to the right.
D. The object moves to the right.
E. The object moves to the right until it reaches the origin and then stops.
F. The object moves to the right until it reaches the origin, stops, then moves to the left.

Problem 9: (KD1-10)
At time t_A, an object is at point A at $x = +1$m along the positive x axis. The object is moving is the negative x direction with velocity -2m/s.

What is the speed of the object?

A. 1m/s
B. -1m/s
C. 2m/s
D. -2m/s

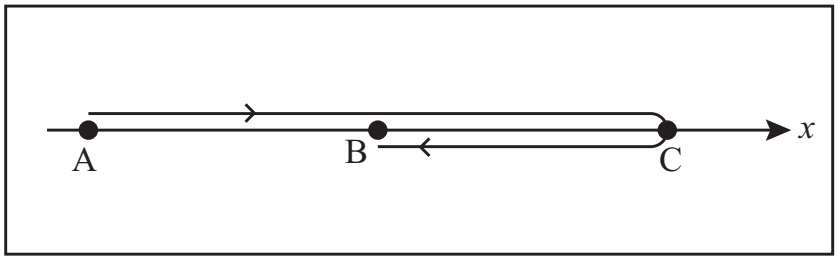
Problem 10: (KD1-10-V6EC)
Object A moves at a rate of 2m/s to the north. Object B moves at a rate of 2m/s to the south. Which of the following best describes the speeds and velocities of the objects?

A. Object A and Object B have the same speed and velocity.
B. Object A and Object B have the same speed but different velocities.
C. Object A and Object B have different speeds, but the same velocity.
D. Object A and Object B have different speeds and different velocities.

Problem 11: (KD1-10-V7EC)
Object A moves at a rate of 2m/s to the north. Object B moves at a rate of 2m/s to the south. Which of the following best describes the speeds and velocities of the objects?

A. Object A and Object B have the same speed, and Object A and Object B have the same velocity.
B. Object A and Object B have the same speed, but Object A and Object B have different velocities.
C. Object A and Object B have different speeds, but Object A and Object B have the same velocity.
D. Object A and Object B have different speeds, and Object A and Object B have different velocities.

Problem 12: (KD1-11)

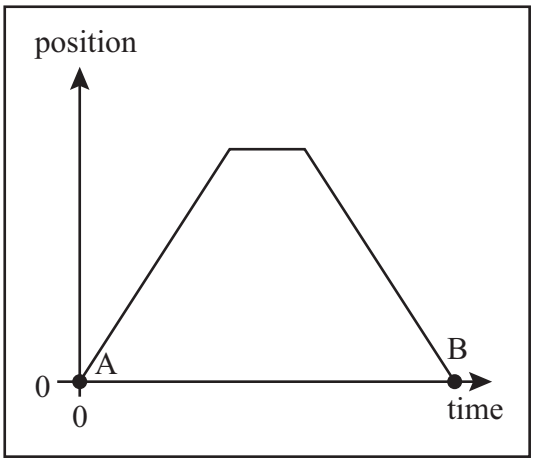


The figure above shows the trajectory of an object that starts at point A, travels to the right with a constant velocity in the x direction of $+1$m/s until it reaches point C, then reverses direction and travels to the left with a constant velocity in the x direction of -1m/s to point B.

Select the response which best represents the relation of the average speed of the object between points A an B and the average velocity in the x direction over the entire trajectory.

A. The average speed and the average velocity are equal.
B. The average speed is greater than the average velocity.
C. The average speed is less than the average velocity.

Problem 13: (KD1-12)



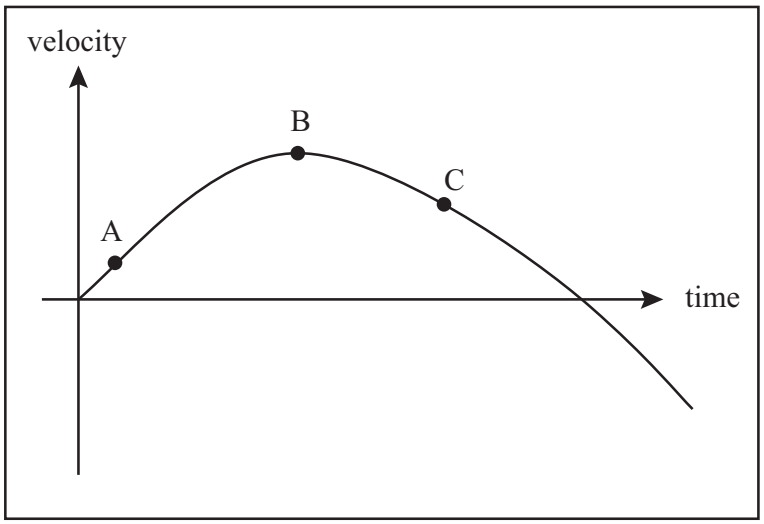
The position versus time graph of an object moving along the x axis is shown above. The object starts at point A at time zero.

Select the response below that best describes its motion after time zero.

A. The object first moves in the positive x direction at constant velocity, then stops moving, then moves in the negative x direction with constant velocity.
B. The object first moves in the positive x direction at constant velocity, then stops moving, then moves in the positive x direction with constant velocity.

C. The object first moves in the positive x direction with increasing velocity, then moves with in the positive x direction with constant velocity, then moves in the positive x direction with negative velocity increasing in magnitude with time.

Problem 14: (KD1-13-V3)

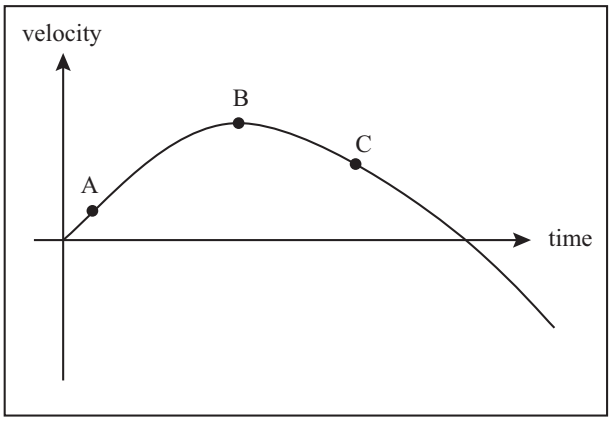


An object moves along the x axis. The figure above shows the graph of the velocity of the object as a function of time.

At which point is the magnitude of the acceleration the greatest?

A. Point A
B. Point B
C. Point C

Problem 15: (KD1-13-V4EC)



An object moves along the x axis. The figure above shows the graph of the velocity of the object as a function of time.

Select the inequality that represents the relation of a, the acceleration in the x direction, at points A, B, and C.

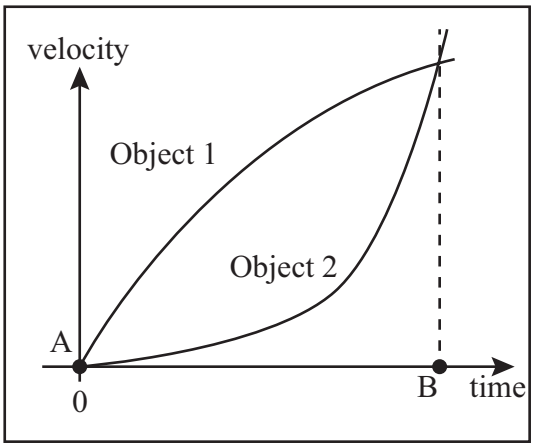
A. $a_B > a_C > a_A$
B. $a_C > a_A > a_B$
C. $a_A > a_B > a_C$
D. $a_C > a_A > a_B$
E. $a_C = a_A = a_B$

Problem 16: (KD1-14)
An object moves in the positive x direction along the x axis. When the object passes through $x = +1$m, the object has a positive velocity of $v = +2$m/s. When the object passes through $x = +2$m, the object has a positive velocity of $v = +1$m/s.

Select the response which best describes the average acceleration in the x direction of the object between the two points.

A. The object's average acceleration is zero.
B. The object's average acceleration is positive.
C. The object's average acceleration is negative.

Problem 17: (KD1-15-V2EC)

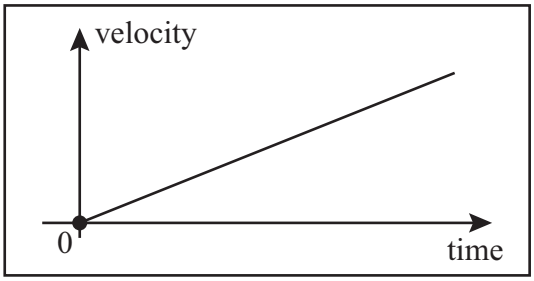


Two objects, Object 1 and 2, move along the x axis. The figure above shows their velocity as a function of time.

Compare the distance traveled by each object between time A and time B.

A. The distance traveled is the same for both objects.
B. Object 1 travels farther than Object 2.
C. Object 2 travels farther than Object 1.

Problem 18: (KD1-16)

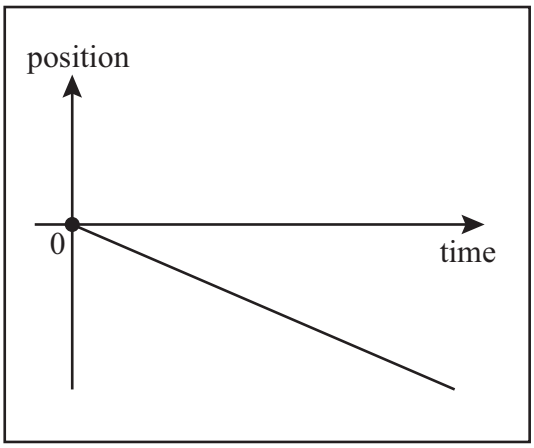


The figure above shows the velocity of an object as a function of time.

Select the response which best describes the velocity of the object and the acceleration of the object. The object moves in one dimension.

A. The velocity and acceleration are constant.
B. The velocity and acceleration increase with time.
C. The velocity is constant and acceleration increases with time.
D. The velocity increases with time and acceleration is constant.

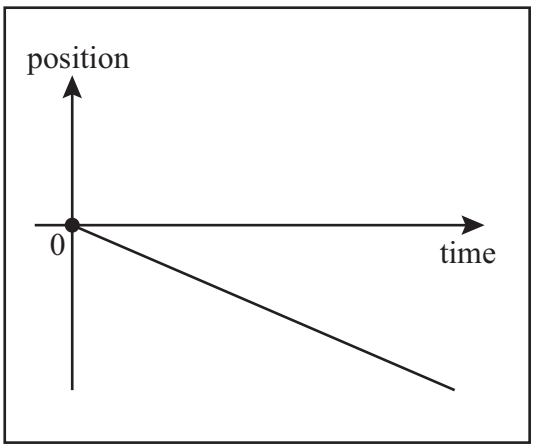
Problem 19: (KD1-17-V3AH)



The figure above shows how the position of an object changes with time. Compare the velocity of the object with the acceleration of the object.

A. The velocity and acceleration both decrease in magnitude with time.
B. The velocity and acceleration are constant. Both are less than zero.
C. The velocity is constant and negative while the acceleration is constant and positive.
D. The velocity is constant and negative while the acceleration zero.

Problem 20: (KD1-17-V2EC)



The figure above shows the position of an object as a function of time. Compare the velocity of the object with the acceleration of the object.

A. The velocity and acceleration are constant. Both are greater than zero.

B. The velocity and acceleration both decrease in magnitude with time.
C. The velocity and acceleration are constant. Both are less than zero.
D. The velocity is constant and negative while the acceleration is constant and positive.
E. The velocity is constant and negative while the acceleration is zero.

Problem 21: (KD1-18)
An object moves in one dimension, along the x-axis. The object is at $x = -1$m on the x axis at time $t = 0$. The object's velocity at time $t = 0$ is positive. The object travels along the x axis with a constant positive acceleration in the x direction.

Select the response which best describes the motion of the object at times after $t = 0$.

A. The object moves in the positive x direction with increasing speed.
B. The object moves in the negative x direction with increasing speed.
C. The object moves in the positive x direction with constant speed.
D. The object moves in the positive x direction with decreasing speed until it stops. Then it remains stationary.
E. The object moves in the positive x direction with decreasing speed until it stops. Then it travels in the negative x direction with increasing speed.

Problem 22: (KD1-18-V4EC)
An object moves in one dimension, along the x-axis. At time $t = 0$, the object is at $x = -1$m on the x-axis. The object's velocity is negative at time $t = 0$, and the object has constant positive acceleration. Select the response which best describes the motion of the object.

A. At $t = 0$, the object moves in the negative x direction with increasing speed.
B. At $t = 0$, the object moves in the negative x direction with decreasing speed.
C. At $t = 0$, the object moves in the negative x direction with constant speed.
D. At $t = 0$, the object moves in the positive x direction with increasing speed.
E. At $t = 0$, the object moves in the positive x direction with decreasing speed.
F. At $t = 0$, the object moves in the positive x direction with constant speed.

Problem 23: (KD1-18-V5EC)
An object moves in one dimension, along the x-axis. At time $t = 0$, the object is at $x = -1$m on the x-axis. The object's velocity is negative at time $t = 0$, and the object has constant positive acceleration. Select the response which best describes the motion of the object at $t = 0$.

A. The object moves in the negative x direction with increasing speed.
B. The object moves in the negative x direction with decreasing speed.
C. The object moves in the negative x direction with constant speed.
D. The object moves in the positive x direction with increasing speed.
E. The object moves in the positive x direction with decreasing speed.
F. The object moves in the positive x direction with constant speed.

Problem 24: (KD1-19)
An object moves in one dimension, along the x-axis. An object is at $x = +1$m on the x axis at time $t = 0$. The object's velocity at time $t = 0$ is positive. The object travels with a constant negative acceleration.

Select the response which best describes at motion of the object at times after $t = 0$.

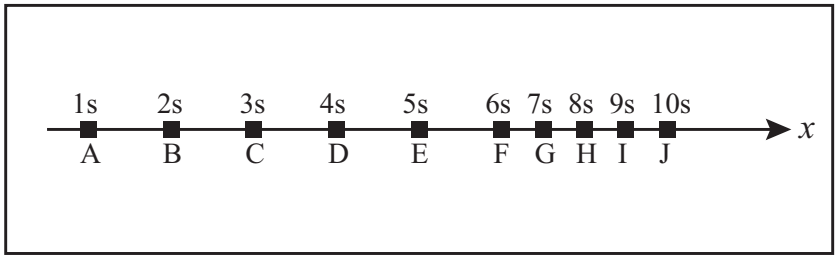
A. The object moves in the positive x direction with increasing speed.
B. The object moves in the negative x direction with increasing speed.
C. The object moves in the positive x direction with constant speed.
D. The object moves in the positive x direction with decreasing speed until it stops. It, then, remains stationary.
E. The object moves in the positive x direction with decreasing speed until it stops. It, then, travels in the negative x direction with increasing speed.

Problem 25: (KD1-19-V3)
An object moves in one dimension, along the x-axis. At time $t = 0$, the object is at $x = +1$m on the x-axis. The object's velocity is positive at time $t = 0$, and the object has constant negative acceleration.

Select the response which best describes the motion of the object, starting at $t = 0$.

A. The object moves in the negative x direction with increasing speed until it eventually stops, then travels in the positive x direction with decreasing speed.
B. The object moves in the positive x direction with decreasing speed until it eventually stops, then travels in the negative x direction with increasing speed.
C. The object moves in the positive x direction with decreasing speed until it eventually stops, then continues to travel in the positive x direction with decreasing speed.
D. The object moves in the negative x direction with decreasing speed until it eventually stops, then travels in the positive x direction with decreasing speed.

Problem 26: (KD1-20-V2EC)

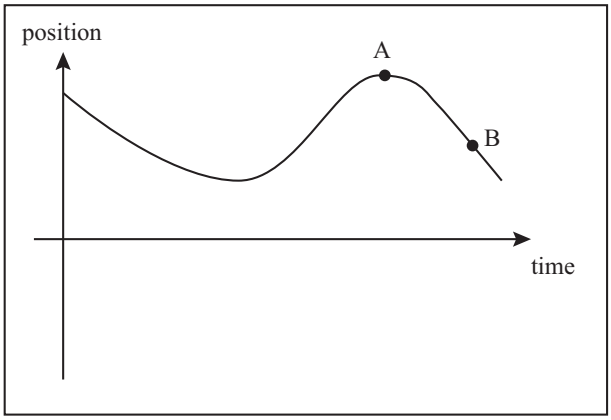


The figure above shows the motion of an object in the positive x direction. The position of the object is indicated by a set of squares. Each sequential square is one second apart in time.

Select the response which best describes the average acceleration of the object between point C and point H.

A. The average acceleration is zero.
B. The average acceleration is positive.
C. The average acceleration is negative.

Problem 27: (KD1-21-V2)

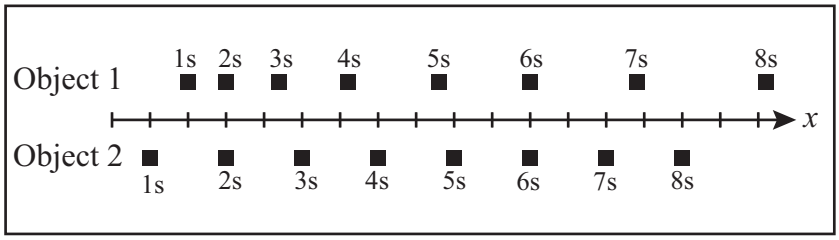


The figure above shows the graph of the position of an object as a function of time.

Compare the magnitude of the acceleration of the object at point A and B.

A. The magnitude of the acceleration is approximately equal at points A and B.
B. The magnitude of the acceleration is larger at point A than point B.
C. The magnitude of the acceleration is larger at point B than point A.

Problem 28: (KD1-22-V2EC)



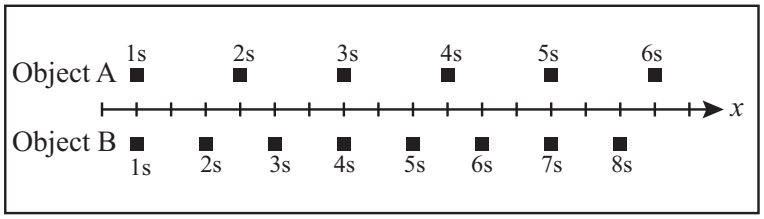
The figure above shows the position of two objects moving in the positive x direction. The time interval between each numbered square is one second.

Do the objects ever have the same speed?

A. No. The objects **never** have the same speed.

B. The objects have the same speed **at** points 2s and 6s.
C. The objects have the same speed somewhere **between** points 2s and 5s.

Problem 29: (KD1-23-V2)

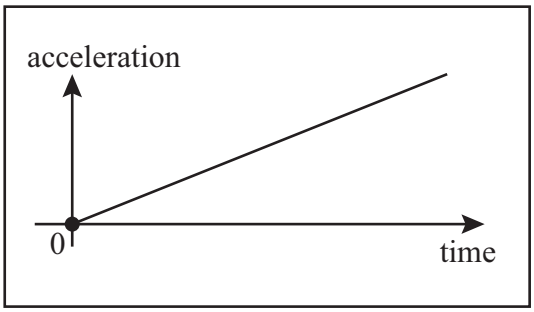


The figure above shows the position of two objects moving in the positive x direction. The time interval between each numbered square is one second.

Select the response that best describes the relation of the acceleration of the two objects.

A. The acceleration of object A is greater than the acceleration of object B.
B. The acceleration of objects A and B are equal. Both accelerations are greater than zero.
C. The acceleration of object B is greater than the acceleration of object A.
D. The acceleration of objects A and B are equal. Both accelerations are zero.
E. The acceleration of objects A and B are equal. Both accelerations are less than zero.

Problem 30: (KD1-24)



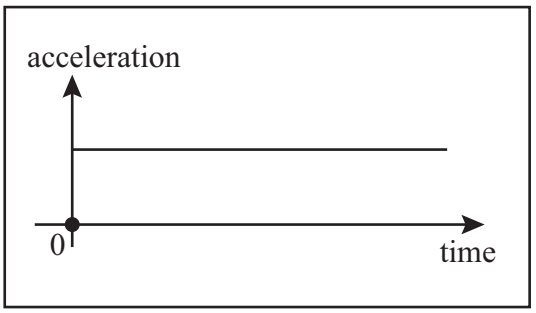
The figure above shows the acceleration of an object as a function of time. The object moves along the x axis. The positive direction is to the right of the page. The object is at the origin and has a positive velocity at time zero.

Select the response which best describes the motion of the object after time zero.

A. The object moves to the right speeding up at a constant rate.

B. The object moves to the right slowing down at a constant rate.
C. The object moves to the right with constant speed.
D. The object moves to the right speeding up at an increasing rate.
E. The object moves to the right speeding up at an decreasing rate.

Problem 31: (KD1-25)

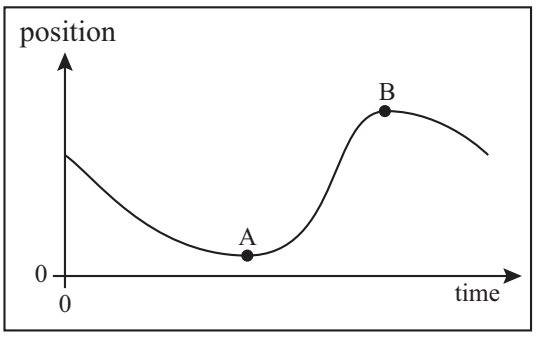


The figure above shows the acceleration of an object as a function of time. The object moves along the x axis. The object is at the origin and has a positive velocity at time zero.

Select the response which best describes the motion of the object.

A. The object is stationary.
B. The object moves to the right speeding up at a constant rate.
C. The object moves to the right with constant speed.
D. The object moves to the right speeding up at an increasing rate.
E. The object moves to the right slowing down at a constant rate.

Problem 32: (KD1-28)

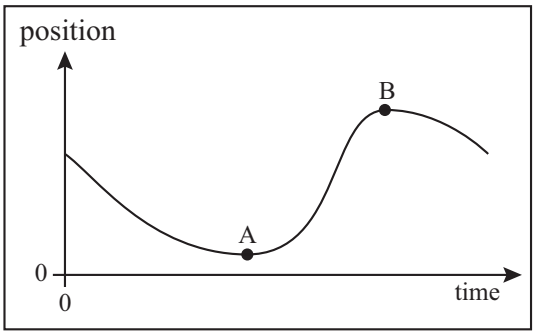


The figure above shows the position of an object traveling along the x axis as a function of time.

Select the response that best describes the acceleration of the object at point A and at point B.

A. The acceleration at point A is approximately equal to the acceleration at point B. Both are zero.
B. The acceleration at point A is less than the acceleration at point B. Both are positive.
C. The acceleration at point A is negative and the acceleration at point B is positive.
D. The acceleration at point A is positive and the acceleration at point B is negative.

Problem 33: (KD1-28-V2AH)

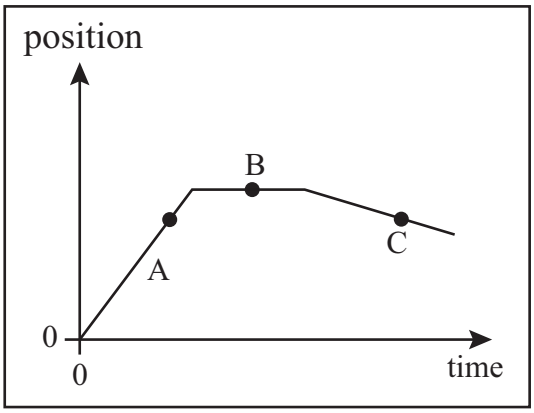


The figure below shows the position of an object traveling along the x axis as a function of time.

Select the response that best describes a_A the acceleration of the object at point A, and a_B

A. $a_A = a_B = 0$
B. $a_A < a_B$. Both are positive.
C. a_A is negative, and a_B is positive.
D. a_A is positive, and a_B is negative.

Problem 34: (KD1-29)

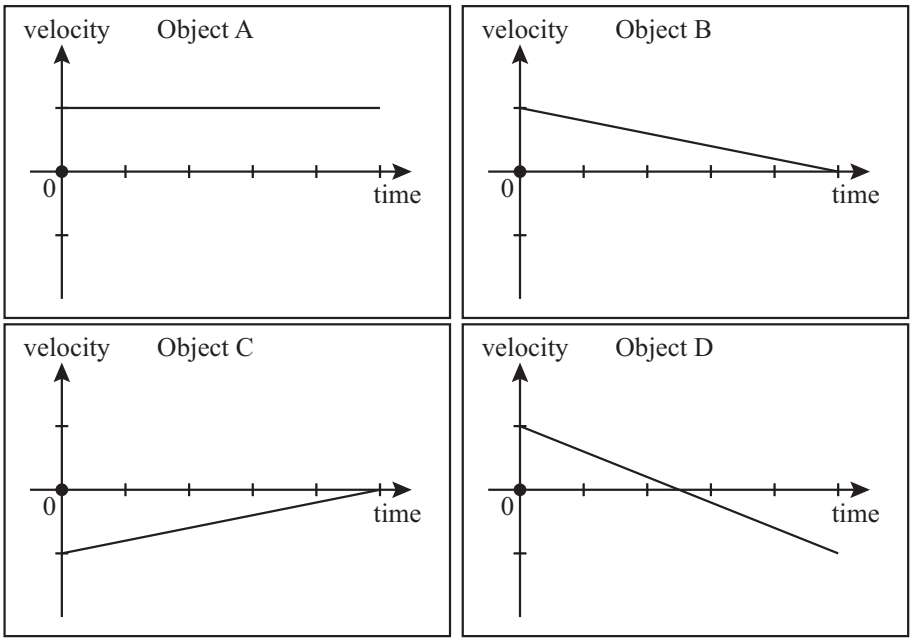


An object moves along the x axis. The figure above shows the graph of the position along the x axis as a function of time. Three locations on the plot have been marked.

Select the inequality below that best represents the relation of the speed at points A, B, and C.

A. $\text{speed}_A = \text{speed}_B = \text{speed}_C$
B. $\text{speed}_A > \text{speed}_C > \text{speed}_B$
C. $\text{speed}_C > \text{speed}_B > \text{speed}_A$
D. $\text{speed}_C > \text{speed}_A > \text{speed}_B$
E. $\text{speed}_B > \text{speed}_A > \text{speed}_C$

Problem 35: (KD1-32)

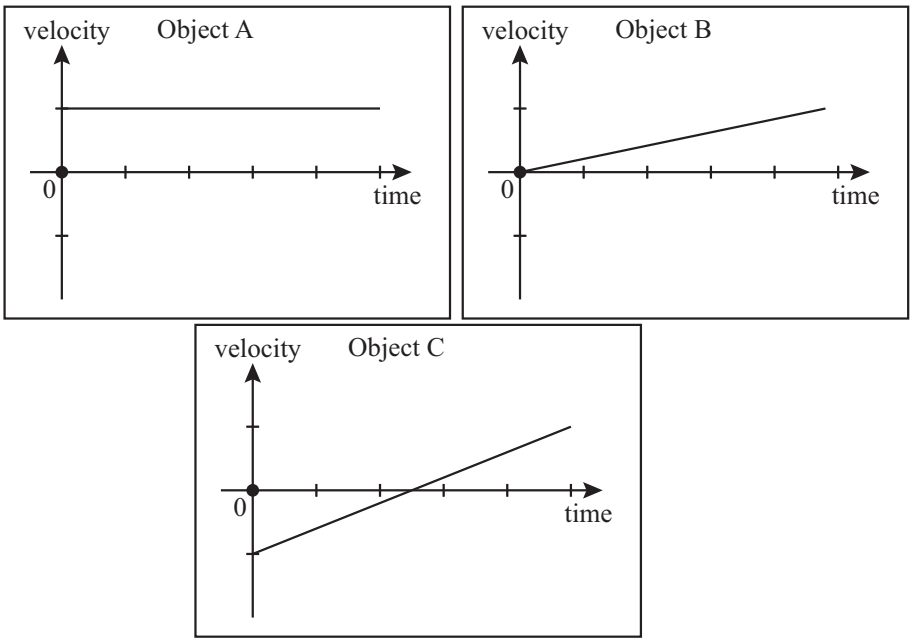


Four objects travel along the x axis. Each figure above shows the velocity along the x axis of a different object as a function of time. All graphs are plotted on the same scale.

Select the response that best describes the relationship of the displacements of the objects over the entire time shown.

A. $\text{displacement}_A > \text{displacement}_B > \text{displacement}_C > \text{displacement}_D$
B. $\text{displacement}_A > \text{displacement}_B = \text{displacement}_C > \text{displacement}_D$
C. $\text{displacement}_A > \text{displacement}_B > \text{displacement}_D > \text{displacement}_C$

Problem 36: (KD1-32-V3AH)

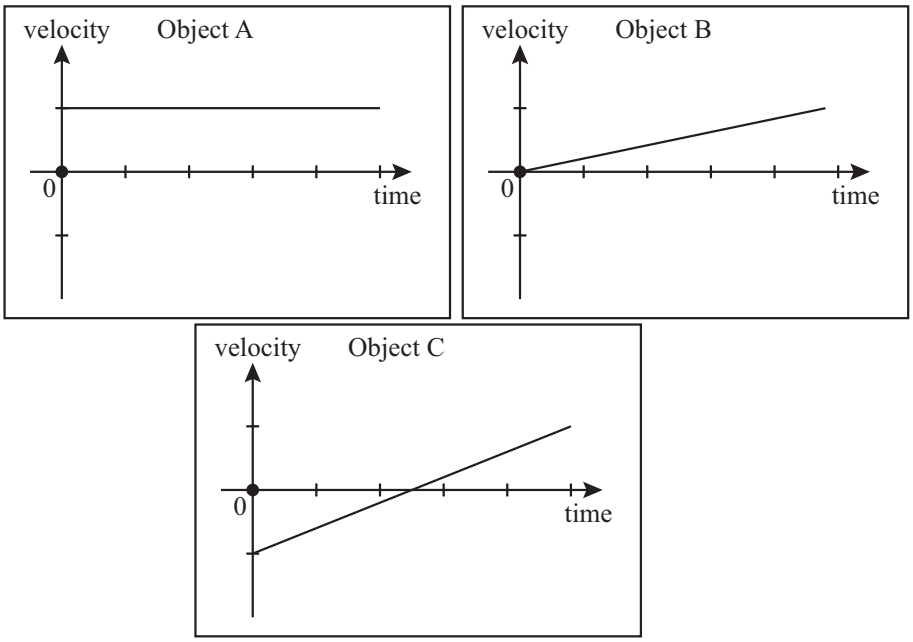


Three objects travel along the x axis. The figures above shows the velocity along the x axis of each object as a function of time. All graphs are plotted on the same scale.

Select the response that best describes the relationship of the displacements of the objects over the entire time shown.

A. $\text{displacement}_\text{A} > \text{displacement}_\text{B} > \text{displacement}_\text{C}$
B. $\text{displacement}_\text{A} = \text{displacement}_\text{B} = \text{displacement}_\text{C}$
C. $\text{displacement}_\text{B} > \text{displacement}_\text{A} = \text{displacement}_\text{C}$
D. $\text{displacement}_\text{B} = \text{displacement}_\text{C} > \text{displacement}_\text{A}$

Problem 37: (KD1-32-V4EC)

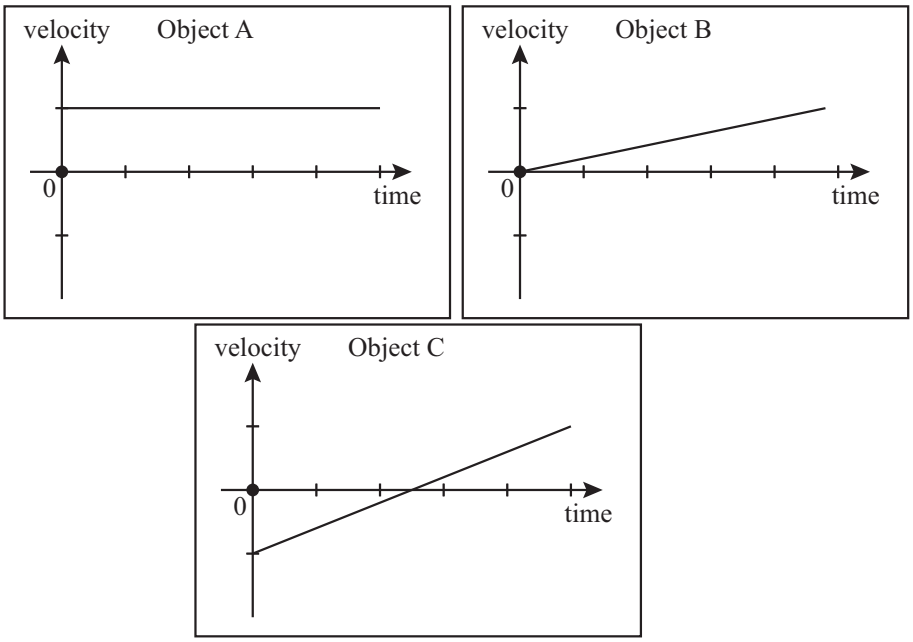


Three objects travel along the x axis. The figures above show the velocity along the x axis of each object as a function of time. All graphs are plotted on the same scale.

Select the response that best describes the relationship of the displacements of the objects over the entire time shown.

A. $\text{displacement}_\text{A} > \text{displacement}_\text{B} > \text{displacement}_\text{C}$
B. $\text{displacement}_\text{A} = \text{displacement}_\text{B} = \text{displacement}_\text{C}$
C. $\text{displacement}_\text{A} = \text{displacement}_\text{C} > \text{displacement}_\text{B}$
D. $\text{displacement}_\text{B} > \text{displacement}_\text{A} = \text{displacement}_\text{C}$
E. $\text{displacement}_\text{B} = \text{displacement}_\text{C} > \text{displacement}_\text{A}$

Problem 38: (KD1-32-V4EC)

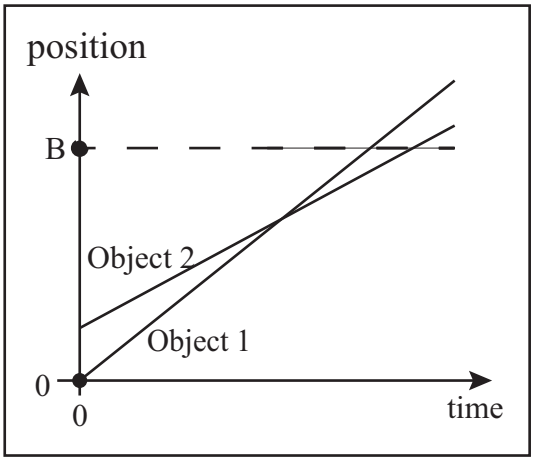


Three objects travel along the x axis. The figures above show the velocity along the x axis of each object as a function of time. All graphs are plotted on the same scale.

Select the response that best describes the relationship of the displacements of the objects over the entire time shown.

A. $\text{displacement}_\text{A} > \text{displacement}_\text{B} > \text{displacement}_\text{C}$
B. $\text{displacement}_\text{A} = \text{displacement}_\text{B} = \text{displacement}_\text{C}$
C. $\text{displacement}_\text{A} = \text{displacement}_\text{C} > \text{displacement}_\text{B}$
D. $\text{displacement}_\text{B} > \text{displacement}_\text{A} = \text{displacement}_\text{C}$
E. $\text{displacement}_\text{B} = \text{displacement}_\text{C} > \text{displacement}_\text{A}$

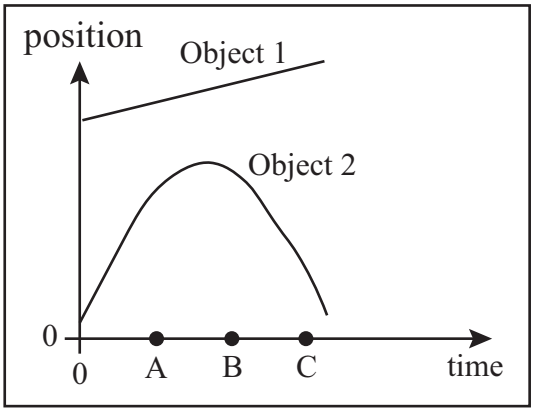
Problem 39: (KD1-34)



The figure above shows the position of two different objects as a function of time.
Select the response that best describes how the motion of Object 2 differs from the motion of Object 1.

A. Object 2 begins at a positive position while object 1 begins at the origin. Both objects travel in the positive direction with constant velocities, but object 1 is going faster. Object 1 passes object 2 and arrives at position B first.
B.
C.

Problem 40: (KD1-35)



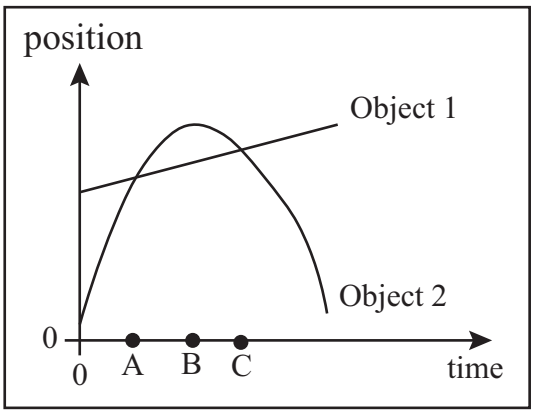
The figure above shows the position of two different objects as a function of time.

Do the two objects ever have the same velocity?

A. No, the two objects never have the same velocity.

B. The objects have the same velocity at time A.
C. The two objects have the same velocity at some time between time A and time B.

Problem 41: (KD1-35-V3AH)



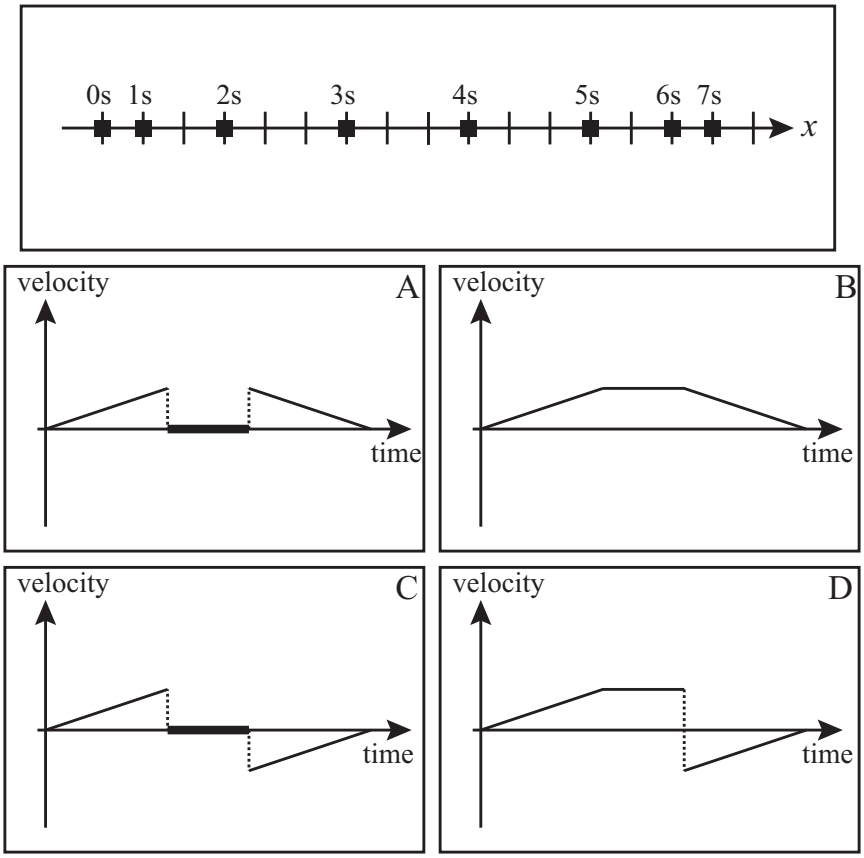
The figure below shows the position of two different objects as a function of time.

Do the two objects ever have the same velocity?

A. No, the two objects never have the same velocity.
B. Yes, the objects have the same velocity at times A and C.
C. Yes, the two objects have the same velocity at some time between time A and time B.
D. No, because two objects have different accelerations.

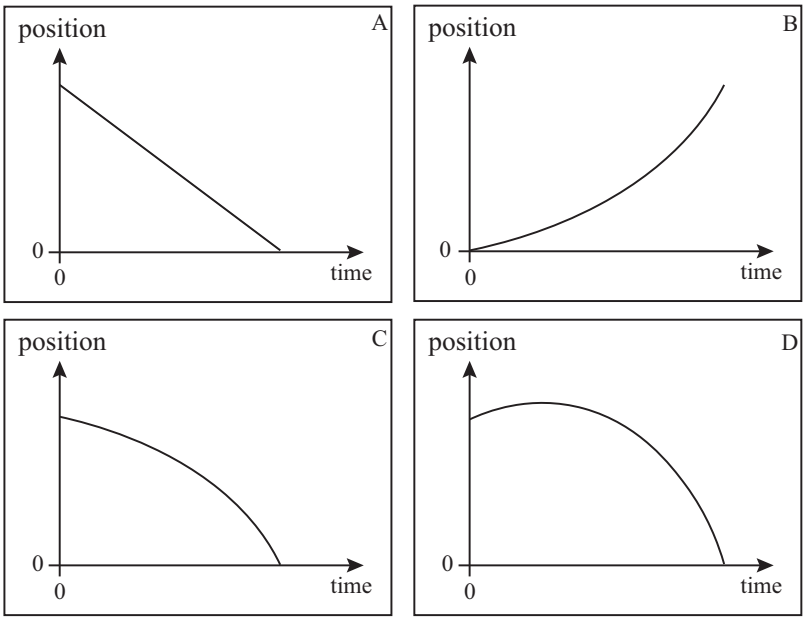
Problem 42: (KD1-36)
The top figure shows the position of an object moving in the x direction. The time interval between each pair of consecutive squares is one second.

Which of the graphs best represents the object's velocity as a function of time?

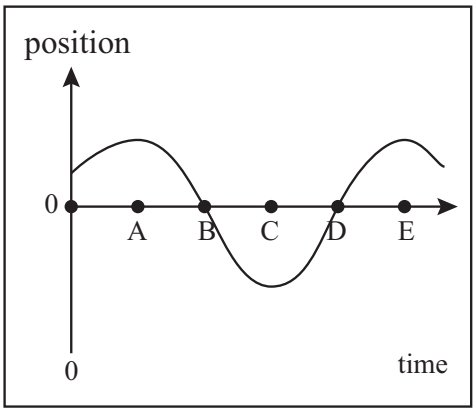


Problem 43: (KD1-37)
An object is initially moving in the positive x direction with a constant negative acceleration.

Which of the following could be a graph of the object's position as a function of time?



Problem 44: (KD1-38-V6EC)



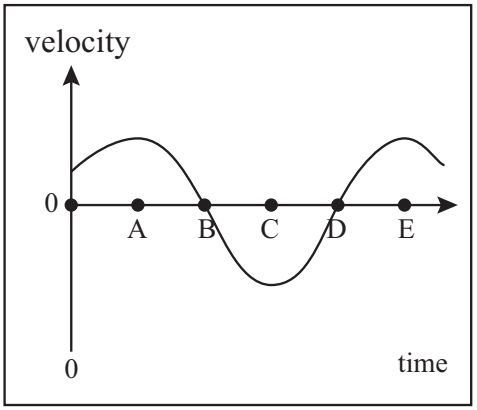
An object is moving along the x axis. The position of the object as a function of time is shown in the figure above.

When does the object turn around?

A. At times A and E
B. At times B and D
C. At time C

D. At times A, C, and E
E. At times A, B, C, D, and E

Problem 45: (KD1-38-V3AH)

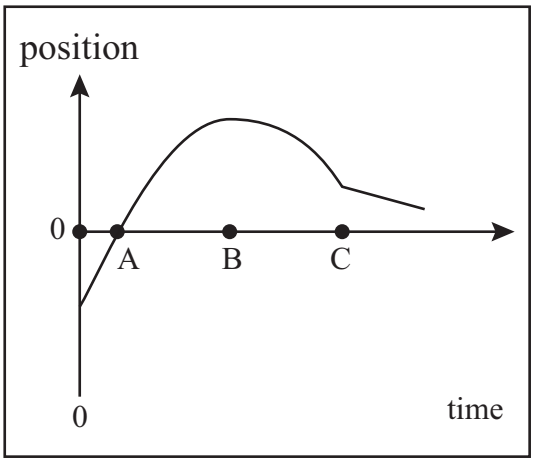


An object is moving along the x axis. The velocity of the object as a function of time is shown in the figure above.

When does the object change its direction of motion?

A. At times A and E
B. At times B and D
C. At time C
D. At times A, C, and E
E. At times A, B, C, D, and E

Problem 46: (KD1-39-V3AH)

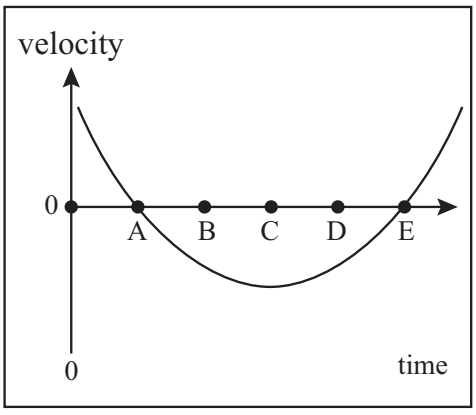


An object is moving along the x axis. The velocity of the object as a function of time is shown in the figure below.

When does the object change its direction of motion?

A. At time A.
B. At time B.
C. At time C.

Problem 47: (KD1-39)



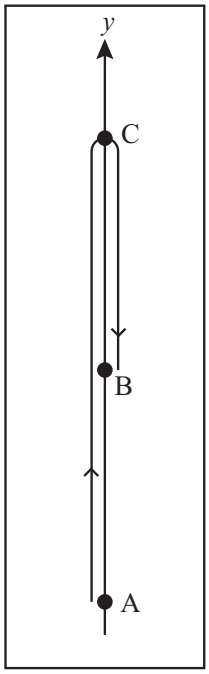
An object is moving along the x axis. The velocity of the object as a function of time is shown in the figure above.

When does the object change its direction of motion?

A. At times A and E
B. At times B and D
C. At time C

Problem 48: (KD1-40)

An object is launched straight upwards in the positive y direction. Its trajectory is shown in the figure to the right.

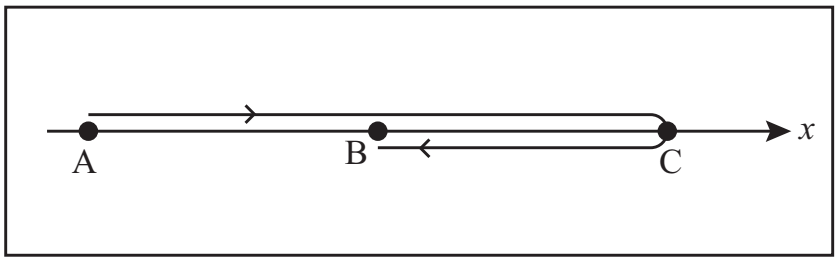


Select the response that best describes the object's velocity and acceleration at point C.

A. At point C, the object's velocity in the y direction is zero, and its acceleration in the y direction is zero.
B. At point C, the object's velocity in the y direction is positive and it's acceleration is negative.
C. At point C, the object's velocity in the y direction is zero and its acceleration in the y direction is negative.
D. At point C, the object's velocity in the y direction is negative, and its acceleration in the y direction is negative.

Problem 49: (KD1-40-V4EC)

The figure below shows the path of an object that starts at point A, travels to the right along the x axis until it reaches point C, then reverses direction and travels to the left along the x axis to point B.

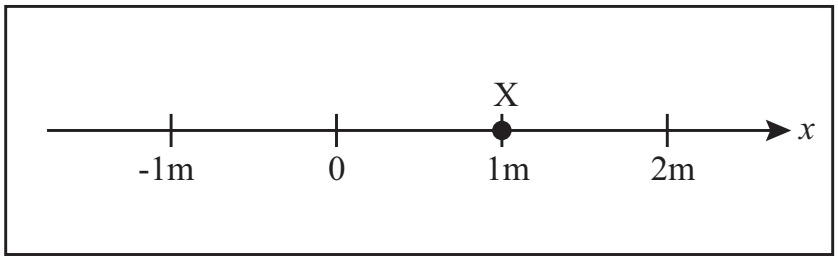


Select the response that best describes the object's velocity and acceleration at **point C**.

A. The object's velocity in the x direction is zero, and its acceleration in the x direction is zero.

B. The object's velocity in the x direction is positive, and its acceleration is negative.
C. The object's velocity in the x direction is zero, and its acceleration in the x direction is negative.
D. The object's velocity in the x direction is negative, and its acceleration in the x direction is negative.

Problem 50: (KD1-41)

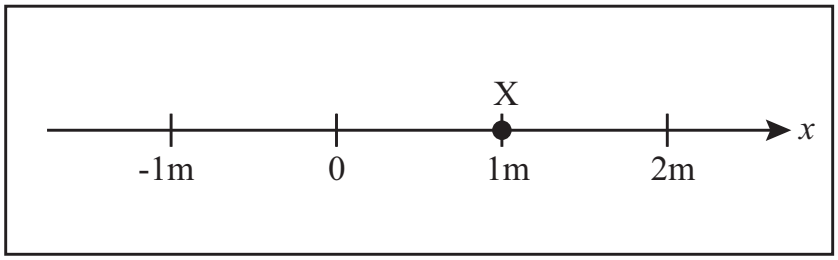


An object moves along the x axis as shown above. When it passes the point X, it has velocity +2m/s.

Which of the following could be true about the acceleration at point X?

A. The acceleration is not zero and points to the right.
B. The acceleration is not zero and points to the left.
C. The acceleration is zero.
D. Both A and B are possible.
E. Both A and C are possible.
F. Both A and D are possible.
G. A, B, and C are possible.

Problem 51: (KD1-42-V6EC)



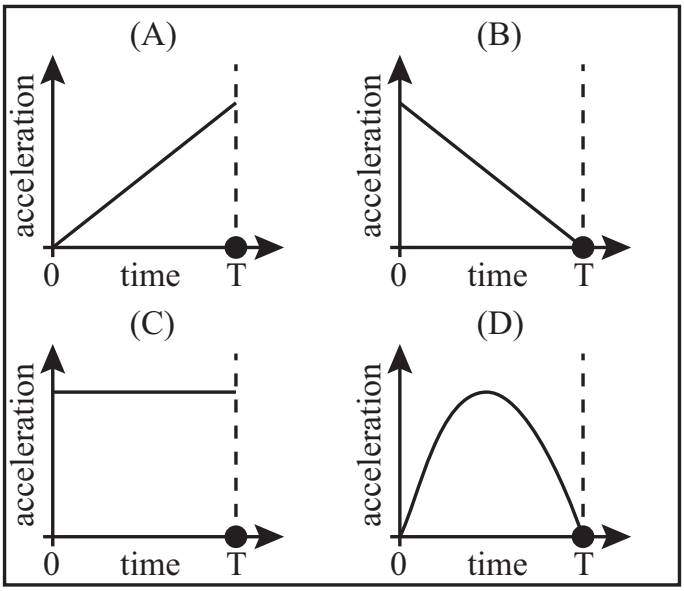
An object moves along the x axis as shown above. It is traveling either to the left or the right. When it passes the point X, it has acceleration $+2\text{m/s}^2$.

Which of the following could be true about the motion of the object when it passes through point X?

A. The object is moving to the right and its speed is increasing.

B. The object is moving to the right and its speed is decreasing.
C. The object is moving to the left and its speed is increasing.
D. The object is moving to the left and its speed is decreasing.
E. Both A and B are possible.
F. Both A and C are possible.
G. Both A and D are possible.
H. A, B, C, and D are possible.

Problem 52: (KD1-43-V6EC)

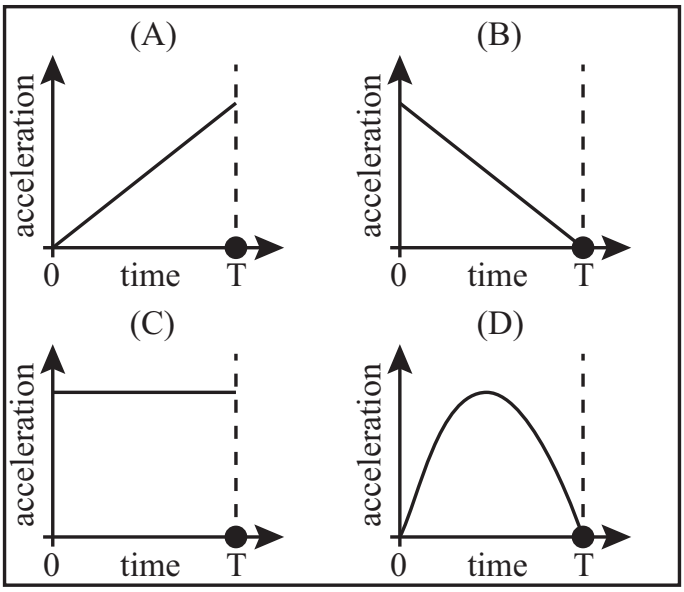


The figure above shows four acceleration versus time graphs for an object moving in a straight line. All graphs are plotted on the same scale.

Select the graph where the change in velocity from time 0 to time T is the greatest.

A. Graph A
B. Graph B
C. Graph C
D. Graph D
E. Graphs A and B

Problem 53: (KD1-43)

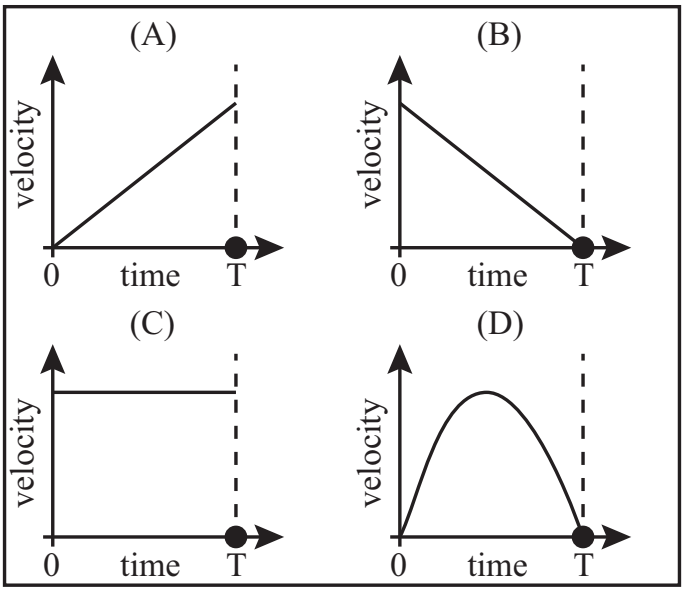


The figure above shows four acceleration versus time graphs for an object moving in a straight line.

Select the graph where the change in velocity from time 0 to time T is the greatest.

A. Graph A
B. Graph B
C. Graph C
D. Graph D
E. Graph A and B

Problem 54: (KD1-44-V6EC)

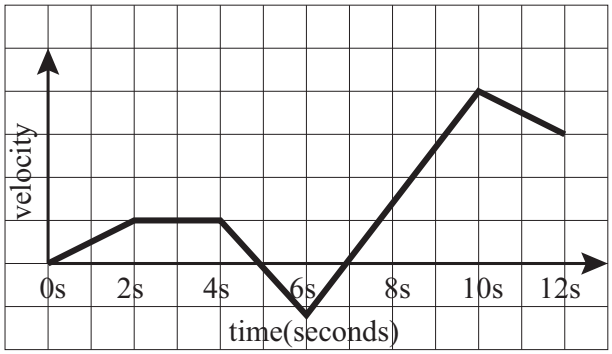


The figure above shows four velocity versus time graphs for an object moving in a straight line. All graphs are plotted on the same scale.

Select the graph where the displacement from time 0 to time T is the greatest.

A. Graph A
B. Graph B
C. Graph C
D. Graph D
E. Graphs A and B

Problem 55: (KD1-45)

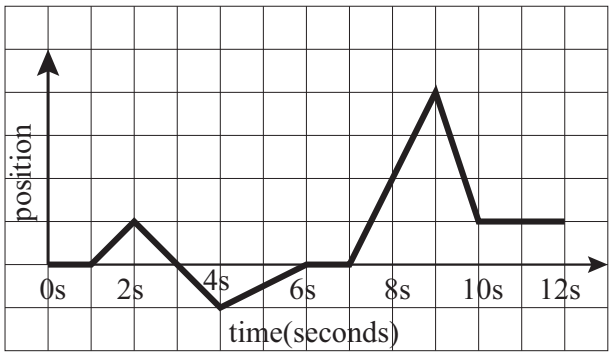


The figure above shows a velocity versus time graph for an object moving in a straight line.

Select the time or times with greatest negative acceleration.

A. from 4s to 6s
B. at 6s
C. from 5s to 7s
D. from 6s to 10s
E. from 10s to 12s

Problem 56: (KD1-46)



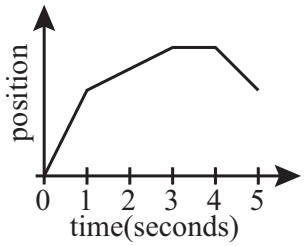
The figure above shows a position versus time graph for an object moving in a straight line.

Select the time or times with greatest negative velocity.

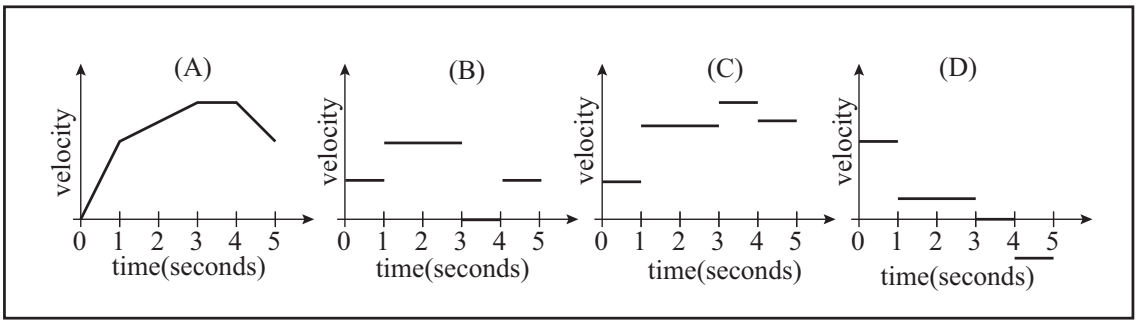
A. from 2s to 4s
B. at 4s
C. from 4s to 6s
D. from 7s to 9s
E. at 9s
F. from 9s to 10s

Problem 57: (KD1-47)

The figure to the right shows the position as a function of time for an object moving in a straight line.

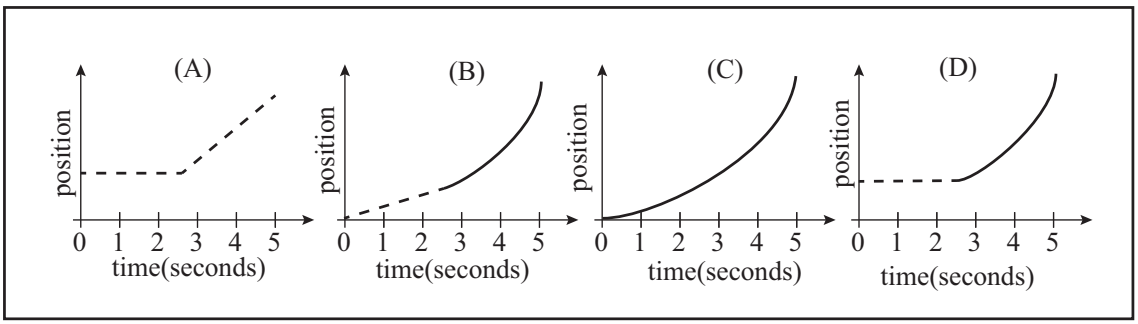


Select the figure below which represents the velocity as a function of time for the period from 0s to 5s.



Problem 58: (KD1-48)
An object starts from rest at time $t = 0$ and travels with a constant positive velocity for 2.5 seconds. It then travels with a positive acceleration until 5 seconds.

Select the figure below which best represents its position as a function of time. To help read the graph, straight segments are dashed lines and curved segments are solid lines.

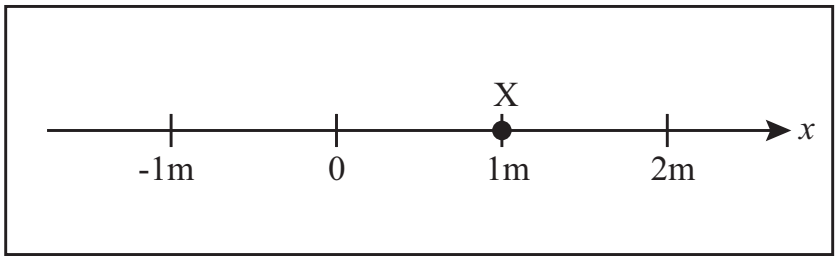


Problem 59: (KD1-51)
An object moves in one dimension, along the x-axis. An object is at $x = -1$m on the x axis at time $t = 0$. The object's velocity at time $t = 0$ is negative. The object travels along the x axis with a constant negative acceleration in the x direction.

Select the response which best describes the motion of the object at times after $t = 0$.

A. The object moves in the positive x direction with increasing speed.
B. The object moves in the negative x direction with increasing speed.
C. The object moves in the positive x direction with constant speed.
D. The object moves in the positive x direction with decreasing speed until it stops. It then remains stationary.
E. The object moves in the positive x direction with decreasing speed until it stops. It then travels in the negative x direction with increasing speed.

Problem 60: (KD1-52)



An object is located on the x axis as shown above. When it passes the point X, it has acceleration -2m/s^2.

Which of the following could be true about the speed of the object when it passes through point X?

A. The speed is decreasing.
B. The speed is increasing.
C. The speed is instantaneously zero.
D. Both A and B are possible.
E. Both A and C are possible.
F. A, B, and C are possible.