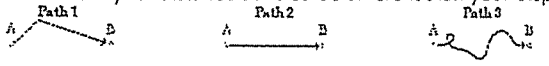
Physics First One-D Motion Review Sheet [2013]

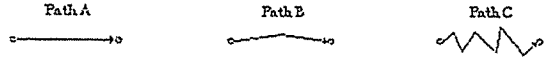
DISTANCE and DISPLACEMENT Review Problems

1. What is the difference between distance and displacement?
2. Tricia runs suicides for basketball practice. She runs 10 feet to the right, 10 feet to the left, 20 feet to the right, 20 feet to the left. What is her total distance and displacement?
3. Patrick cycles up and down the Colorado mountains. He travels 400 meters north and 800 meters south. What is his total distance and displacement? What would he have to do to have a displacement of zero from where he is at the end of his ride?
4. True or false. An object can be moving for 20 seconds and have a displacement of zero. Explain.
5. Can the displacement ever be larger than the distance traveled? Explain.
6. Suppose that you run along three different paths from location A to location B. Along which path(s) would your distance traveled be different than your displacement.



SPEED AND VELOCITY Review Problems

1. Define "speed" and "velocity".
2. What is the equation for average speed? What is the equation for average velocity?
3. True or false. An object can be moving for 20 seconds and have a velocity of zero. Explain.
4. Suppose you are considering the three different paths between the same two locations. Rank these in order of increasing (from least to greatest) speed. Then rank in order of increasing velocity.



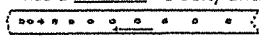
5. ***If a car travels 400 m at a constant speed in 20 seconds how fast is it going?
6. ***It takes Serina 15 minutes to drive to school. Her route is 16 km long. What is Serina's speed on her drive to school in km/min?
7. ***How much time would it take an airplane to reach its destination if it traveled at an average speed of 790 km/hr for a distance of 4,700 km?
8. ***How long would it take you to swim across a lake that is 900 meters across if you swim at a seed of 1.5 m/s?
9. ***Umbro the beagle is chasing after a tennis ball being thrown by his owner (and best friend). He runs 40 meters to the right in 4 seconds, then all the way back in 6 seconds. What is his average speed and average velocity?
10. ***The next time his owner throws the ball, Umbro runs for 60 meters in 5 seconds, but is moving so quickly he overshoots his target. He backtracks 20 meters in 2.2 seconds. What is his average speed and velocity?

POSITION-TIME Review Problems

1. A horizontal line on a position-time graph means _____.
2. A curved line line on a position-time graph means _____.
3. A straight diagonal line on a position-time graph means _____.
4. If an object has a positive position it is located _____ the X axis and is therefore to the _____ of the origin.
   a. above, to the right
   b. below, to the left
   c. above, to the left
   d. below, to the right
5. If an object has a positive velocity it has a _____ slope and is therefore moving in a _____ direction.
   a. positive, rightward
   b. positive, leftward
   c. negative, rightward
   d. negative, leftward
6. How do we calculate the speed of an object by looking at position-time graphs?

ACCELERATION Review Problems

1. Define acceleration. What are the units of acceleration?
2. In what three cases do you have acceleration occurring?
3. An object is accelerating if it is moving ____. Choose all that apply.
   a. with changing speed
   b. extremely fast
   c. downward
   d. in a circle
   e. with constant velocity
   f. none of these
4. An object is not accelerating, then one knows for sure that it is _____.
   a. at rest
   b. slowing down
   c. moving with a constant speed
   d. moving at a constant velocity
5. An object speeds up if is velocity is in the _____ direction as its acceleration.
   a. same
   b. opposite
6. In what direction must the acceleration be pointing if you have
   a. velocity to the right, speeding up
   b. velocity to the left, speeding up
   c. velocity to the right, slowing down
7. An object is moving from RIGHT to LEFT, as represented by the oil drop diagram below. This object has a _____ velocity and a _____ acceleration

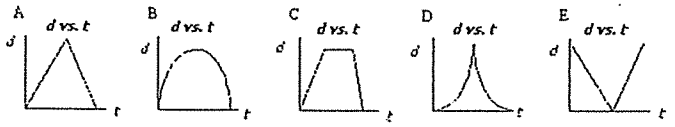


   a. rightward, rightward
   b. leftward, leftward
   c. rightward, leftward
   d. leftward, rightward

8. ***A car's velocity changes from 20 m/s to 13 m/s in 5 seconds. What is the car's acceleration?
9. ***A rowing team accelerated at a rate of 0.4 m/s^2 over 75 seconds. If they started from rest, what would be their final velocity?
10. ***How long will it take for an object to accelerate from a velocity of 5 m/s to a velocity of 10 m/s if it speeds up at a rate of 0.3 m/s^2?

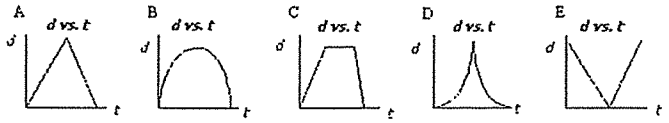
Matching 100

Which object moves towards the origin with a constant speed, and then away from the origin at a constant speed?



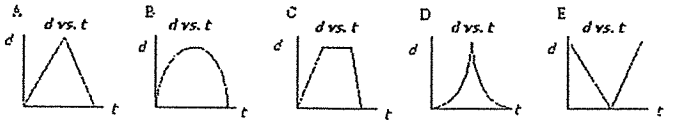
Matching 200

Which object moves away from the origin at a constant speed, stops for some time, and then returns to the origin at a faster speed than before?



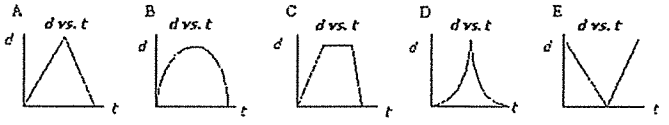
Matching 300

Which object moves away from the origin with a constant speed, and then returns to the origin at a constant speed?



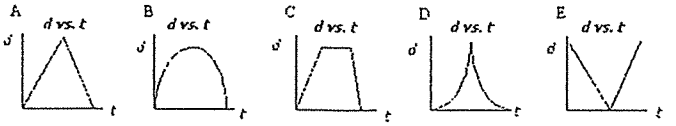
Matching 400

Which object moves away from the origin and speeds up, changes direction, and then slows down heading back to the origin?

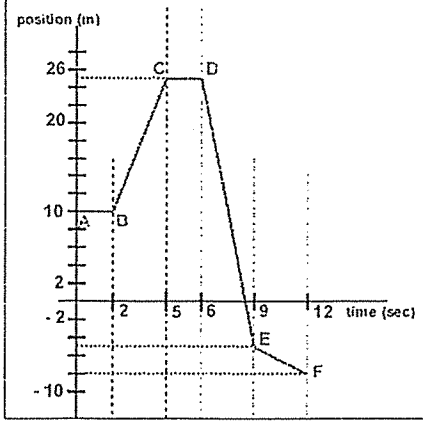


Matching 500

Which object moves away from the origin and slows down, changes direction, and then speeds up heading back to the origin?



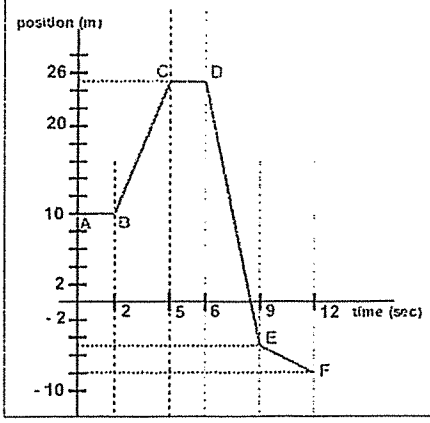
+/-/0 100 pts



When was this object located in a positive position? Choose all that apply!

AB BC CD DE EF

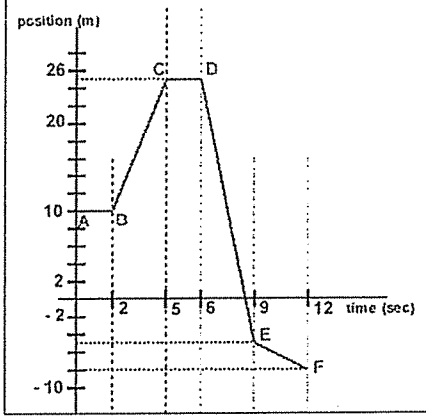
+/-/0 200 pts



When was this object located in a negative position? Choose all that apply!

AB BC CD
DE EF

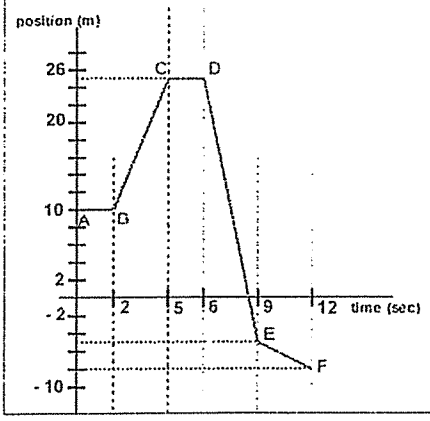
+/-/0 300 pts



When was this object at rest? Choose all that apply!

AB BC CD
DE EF

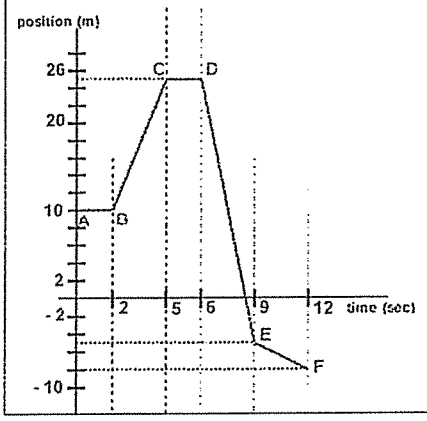
+/-/0 400 pts



When was this object moving in a positive direction? Choose all that apply!

AB BC CD
DE EF

+/-/0 500 pts



When was this object moving in a negative direction? Choose all that apply!

AB BC CD
DE EF

Drawing 100 pts

Draw a position time graph for an object that is at rest.

Drawing 200 pts

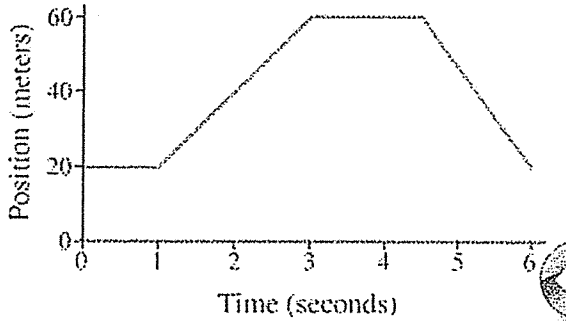
Draw a position time graph for an object that is moving away from the origin at a fast constant speed.

Drawing 300 pts

- Draw a position time graph for an object that is slowing down as it moves away from the origin

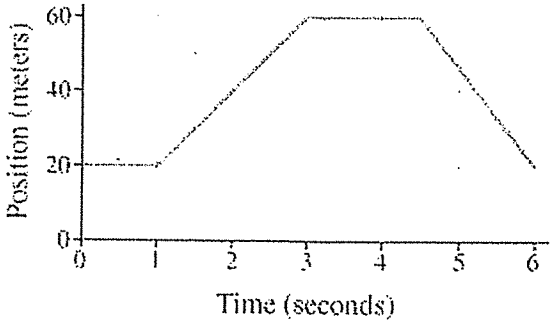
Calculating Speed 100

- What was the speed of the object at t = 4 seconds?



Calculating Speed 200

- What was the speed of the object at t = 2 seconds?



Calculating Speed 300

- What was the speed of the object at t = 5 seconds?