

3 Study Guide

Use with Chapter 3.

Describing Motion

Vocabulary Review

Write the term that correctly completes each statement. Use each term once.

average acceleration
average speed
average velocity
coordinate system
displacement
distance

motion diagram
operational definition
origin
particle model
physical model
pictorial model

position vector
problem-solving strategy
scalar quantity
time interval
vector quantity

1. _____ A series of images of an object that records the object's position after equal time intervals is a(n) _____.
2. _____ A quantity that has magnitude and direction is a(n) _____.
3. _____ The _____ replaces an object by a single point.
4. _____ The zero point of a variable and the direction in which the values of the variable increase is indicated in a(n) _____.
5. _____ An arrow that is proportional to the distance an object is from the origin and points in the direction of the object is a(n) _____.
6. _____ The magnitude of the average-velocity vector is _____.
7. _____ A step-wise procedure for solving problems is a(n) _____.
8. _____ A change in time is a(n) _____.
9. _____ A quantity defined in terms of the procedure used to identify it is a(n) _____.
10. _____ The change in position of an object is its _____.
11. _____ The point in a coordinate system at which the variables have the value of zero is the _____.
12. _____ The length of the displacement vector represents the _____ between the two positions.
13. _____ A model that uses symbols to represent variables is a(n) _____.
14. _____ The ratio of the displacement to the time interval in which the displacement takes place is the _____.
15. _____ A motion diagram is an example of a(n) _____.
16. _____ The _____ is the ratio of the change in velocity to the time interval in which the change took place.
17. _____ A quantity that has only magnitude is a(n) _____.

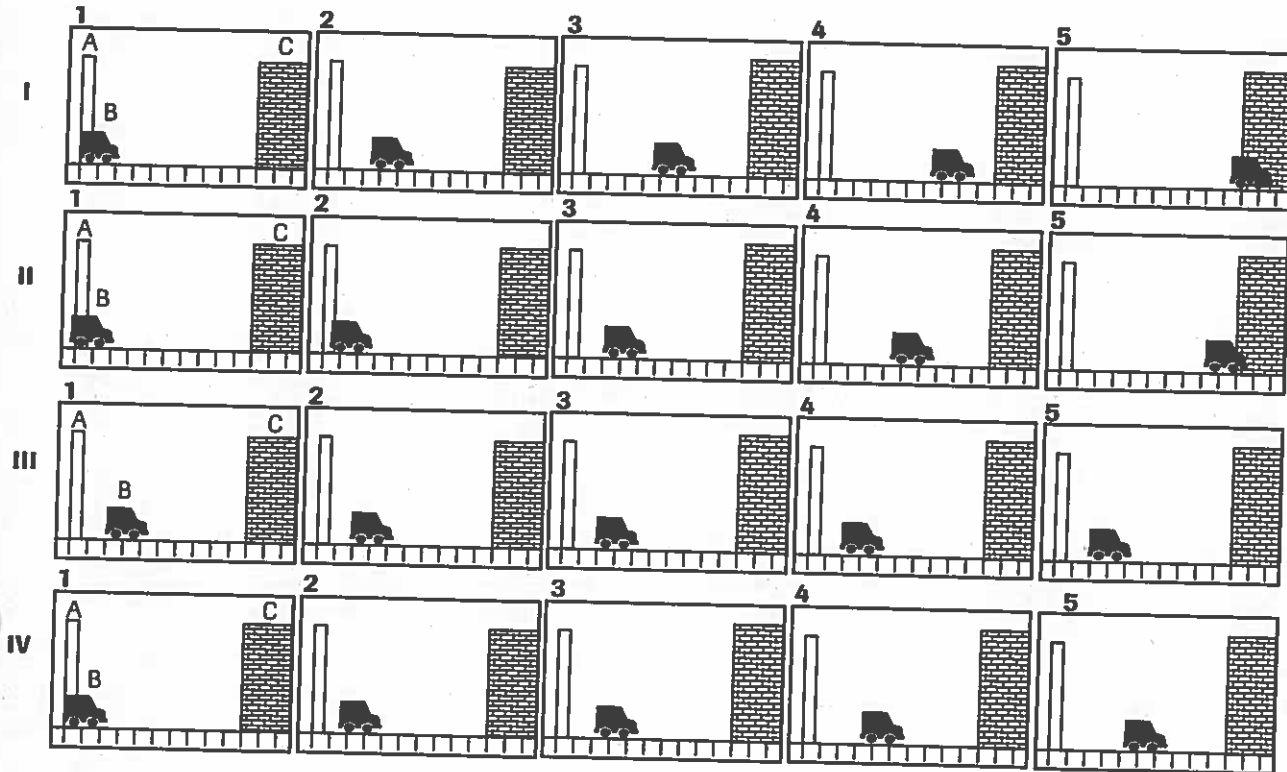
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Section 3.1: Picturing Motion

In your textbook, read about motion diagrams.

Refer to the diagrams below, showing frames from a camcorder at 2-s intervals. Circle the letter of the choice that best completes each statement.



- In set I, the object that is moving is _____.
 - A
 - B
 - C
- Set II shows that object B is _____.
 - at rest
 - increasing its speed
 - slowing down
 - traveling at constant speed
- Set _____ shows object B is slowing down.
 - I
 - II
 - III
 - IV
- Set _____ shows object B at rest.
 - I
 - II
 - III
 - IV
- Set _____ shows object B traveling at a constant speed.
 - I
 - II
 - III
 - IV

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Section 3.2: Where and When?

In your textbook, read about coordinate systems.

Refer to the diagrams below, showing the location of an object represented by a circle. Complete the table by writing the position vector of each object.

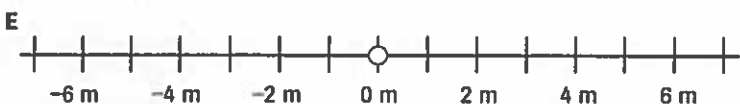
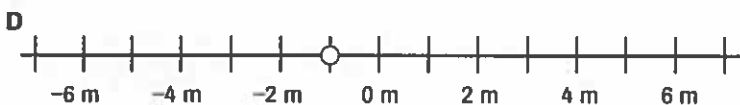
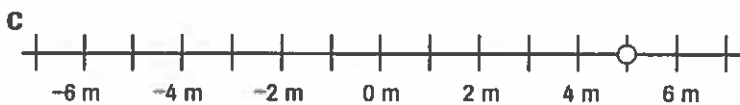
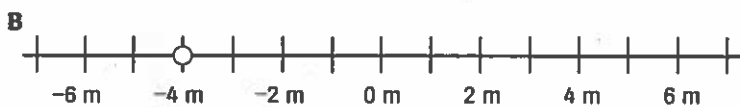
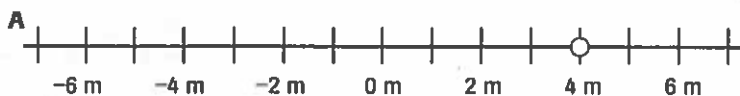


Diagram	Position Vector
A	
B	
C	
D	
E	

In your textbook, read about vectors, scalars, time intervals, and displacements.

For each term on the left, write the letter of the matching term.

- | | |
|---|----------------|
| _____ 1. symbol that represents time interval | a. distance |
| _____ 2. Greek letter delta used to mean change | b. m |
| _____ 3. definition of time interval | c. Δt |
| _____ 4. one way of representing the vector quantity acceleration | d. \vec{a} |
| _____ 5. symbol that represents position | e. Δd |
| _____ 6. magnitude of the displacement vector | f. Δ |
| _____ 7. definition of displacement | g. v |
| _____ 8. one way of representing the vector quantity velocity | h. d |
| _____ 9. symbol that represents displacement | i. $t_1 - t_0$ |
| _____ 10. symbol that represents the scalar quantity mass | j. $d_1 - d_0$ |

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In your textbook, read about time intervals and displacements.

In the space provided, draw and label the vectors d_0 and d_1 for the given information. Then draw and label the vector Δd and determine its magnitude.

11. $d_0 = +4 \text{ m}$ $d_1 = +10 \text{ m}$



12. $d_0 = +2 \text{ m}$ $d_1 = +9 \text{ m}$

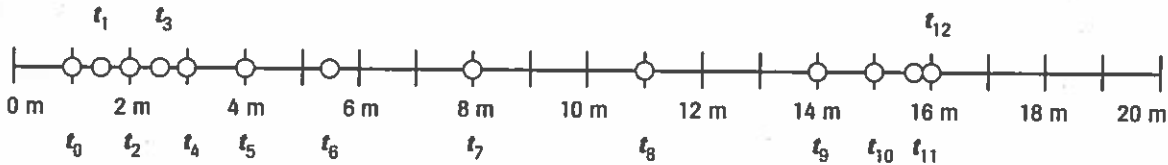


13. $d_0 = -4 \text{ m}$ $d_1 = -6 \text{ m}$



In your textbook, read about time intervals and displacements.

Refer to the motion diagram below, showing the locations of an object during a 12-s interval. Answer the following questions.



14. What is the magnitude of the position vector at $t = 0 \text{ s}$?

15. At what time does the object have a position of $+8.0 \text{ m}$?

16. What is displacement of the object in the time interval $t_6 - t_5$?

17. In what time intervals does the object have a constant speed?

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18. What is happening to the motion of the object in the time interval $t_{12} - t_9$?

19. What distance does the object travel in the time interval $t_{12} - t_0$?

Section 3.3: Velocity and Acceleration

In your textbook, read about velocity.

For each of the statements below, write true or rewrite the italicized part to make the statement true.

- _____ The ratio $\Delta d/\Delta t$ is called the *average velocity*.
- _____ The symbol \bar{v} represents the *average acceleration*.
- _____ The magnitude of the average-velocity vector is the quantity *average distance traveled*.
- _____ Automobile speeds are usually measured in miles per hour (mph) or *kilometers per hour (km/h)*.
- _____ The equation $d_0 + \bar{v} \Delta t$ represents the *position* of an object after the time interval Δt .
- _____ The quantity $\bar{v} \Delta t$ represents the change in *speed* of an object during the time interval Δt .

In your textbook, read about interpreting velocity vectors and acceleration.

Refer to the motion diagram below, showing the position at 1-s intervals of a car traveling to the right along the positive x -axis. In the space provided, draw the displacement, velocity, and acceleration vectors for each time interval. Answer the following questions.



Displacement

Velocity

Acceleration

7. What is happening to the motion of the car during the time intervals in which both the velocity and the acceleration vectors are in the positive direction?

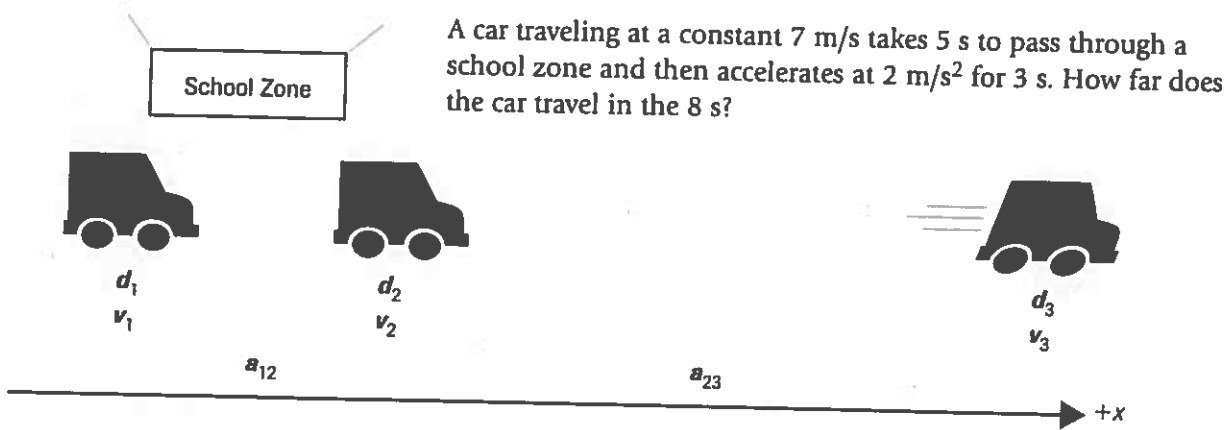
8. What is happening to the motion of the car during the time intervals in which the velocity vectors are positive and the acceleration vectors are negative?

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In your textbook, read about problem-solving strategies.

Read the following problem and refer to the diagram below. Circle the letter of the choice that best completes the statement or answers the question.



A car traveling at a constant 7 m/s takes 5 s to pass through a school zone and then accelerates at 2 m/s² for 3 s. How far does the car travel in the 8 s?

- The diagram above represents a(n) _____ of the problem.
 - physical model
 - operational definition
 - pictorial model
 - particle model
- A likely choice for the origin of the coordinate system would be at a point _____.
 - where the car enters the school zone
 - halfway through the school zone
 - at the beginning of the school zone
 - at the end of the school zone
- Which of the following motion diagrams represents the problem?
 - • ••••
 - • • •••••
 -
 - • • •
- The problem can be thought of as a two-step problem because the car has _____.
 - one displacement
 - constant velocity and an acceleration
 - equal time intervals
 - unequal time intervals
- If d_1 is the position of the car at the beginning of the problem and d_3 is the position of the car at the end of the problem, a good choice of d_2 is the position of the car _____.
 - at the beginning of the school zone
 - halfway through the school zone
 - at the point where the car changes speeds
 - at the point where the car stops
- The acceleration a_{12} , between d_1 and d_2 , is _____.
 - increasing
 - decreasing
 - 0 m/s²
 - +2.0 m/s²
- The acceleration a_{23} , between d_2 and d_3 , is _____.
 - increasing
 - decreasing
 - 0 m/s²
 - +2.0 m/s²
- The vector representing acceleration a_{23} _____.
 - points to the left
 - points to the right
 - is equal to zero
 - is shorter than vector a_{12}