Chapter 11 Review-Answers are at the end

Completion
Complete each statement.

1. _____ is a measure of how far an object has moved.

2. The speed and direction with which an object moves is its _____.

3. The slope of the distance-time graph gives the _____.

4. Acceleration occurs when an object changes its _____ or _____ or both.

5. An object changing its speed from 10 m/s to 3 m/s is undergoing _____ acceleration.

6. As a car slows down approaching a red traffic light its _____ is negative.

7. When calculating acceleration, to find the change in velocity, you subtract the _____ velocity from the _____ velocity.

8. The SI unit for measuring _____ is the meter.

9. The direction and length of a straight line from the starting point to the ending point of an object's motion is _____.

10. Speed is measured in units of _____.

11. A car's speedometer measures _____.

12. $\bar{v} = \frac{d}{t}$ is the equation that defines _____.

13. A constant slope on a distance-time graph indicates _____ speed.

14. The difference between speed and velocity is that velocity indicates the _____ of motion and speed does not.

15. A distance-time graph indicates an object moves 20 km in 4 h. The average speed of the object is _____ km/h.

16. Because its _____ is always changing, an object moving in a circular path experiences a continuous change in velocity.

17. Two or more velocities add by _____.

18. A moving object does not _____ if its velocity remains constant.

19. Freely falling objects accelerate at 9.8 m/s^2 because the force of _____ acts on them.

20. The velocity of an object moving in a straight line changes at a constant rate when the object is experiencing constant _____.

21. The acceleration of a moving object is calculated by dividing the change in _____ by the time over which the change occurs.

22. A car that increases its speed from 20 km/h to 100 km/h undergoes _____ acceleration.

Short Answer

23. A truck travels to and from a stone quarry that is located 2.5 km to the east. What is its distance? What is its displacement?

24. Two cars start at the same point and drive in a straight line for 5 km. At the end of the drive their distances are the same but their displacements are different. Explain.

25. An inline skater is skating around a parking lot. Can she have constant speed and a changing velocity? Changing speed and constant velocity? Explain your answers.

26. Two cars are traveling along the same road at the same speed but at different velocities. Explain.

27. A car is driving down a road. Is it possible for its position to be changing and its acceleration to be zero? Is it possible for its velocity to be changing and its acceleration to be zero?

28. Describe how both velocity and acceleration are rates of change.

29. A car has an acceleration of –5 m/s^2. Describe the car's motion.

Problem

30. A cross-country runner runs 10 km in 40 minutes. What is his average speed?

31. A high speed train travels with an average speed of 227 km/h. The train travels for 2 h. How far does the train travel?

32. Find the acceleration of a car that goes from 32 m/s to 96 m/s in 8.0 s.

33. During a race, a runner runs at a speed of 6 m/s. 2 seconds later, she is running at a speed of 10 m/s. What is the runner's acceleration? Show your work.

34. If you ride your bike at an average speed of 4 km/h and need to travel a total distance of 28 km, how long will it take you to reach your destination? Show your work.

Essay

35. Explain how velocity is different from speed.
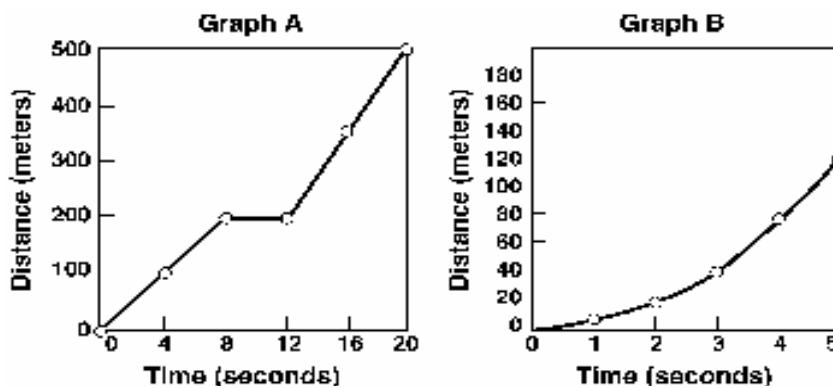
Other

USING SCIENCE SKILLS

Figure 11-2

36. **Using Tables and Graphs** Which graph in Figure 11-2 shows periods of constant speed? Explain your answer.

37. **Interpreting Graphics** Look at Figure 11-2. Describe the motion of the object in Graph A.

38. **Using Models** Which graph in Figure 11-2 shows acceleration? How do you know?

39. **Calculating** Using Graph A in Figure 11-2, calculate the average speed of the object in motion from 12 s to 20 s. Explain your calculation.

Chapter 11 Review
Answer Section

COMPLETION

1. Distance
2. velocity
3. speed
4. speed, direction
5. negative
6. acceleration
7. initial, final
8. distance or length
9. displacement
10. meters per second
11. instantaneous speed
12. average speed
13. constant
14. direction
15. 5
16. direction
17. vector addition
18. accelerate
19. gravity
20. acceleration
21. speed or velocity
22. positive

SHORT ANSWER

23. 5 km, 0 km
24. The two cars drove in different directions.
25. Yes, the skater could be changing directions. No, any change in speed will change the velocity.
26. The two cars are traveling in different directions.
27. Yes, it could have constant speed. No, a change in velocity is always an acceleration.
28. Velocity is the rate of change of position. Acceleration is the rate of change of velocity.
29. The car is slowing down at the rate of 5 m/s every second.

PROBLEM

30. $s = d/t$ = 10 km/40 min = 0.25 km/min
31. $d = s \times y$ = 227 km/h $\times$ (2.00 h) = 454 km
32. $v_f - v_i/t$ = (96 m/s – 32 m/s)/ 8.0 s = 8.0 m/s^2
33. $a = \dfrac{v_f - v_i}{t} = \dfrac{10 \text{ m/s} - 6 \text{ m/s}}{2 \text{ s}} = 2 \text{ m/s}^2$
34. $\bar{v} = \dfrac{d}{t}$

    $t \times \bar{v} = d$

    $t = \dfrac{d}{\bar{v}}$

    $t = \dfrac{28 \text{ km}}{4 \text{ km/h}} = 7 \text{ h}$

ESSAY

35. Speed is equal to the distance traveled divided by the time required to cover the distance. Velocity describes both speed and the direction of motion.

OTHER

36. Graph A shows periods of constant speed (0–8 s, 8–12 s, 12–20 s).
37. The object moves at constant speed for 8 seconds, is at rest for the next 4 seconds, and then moves at constant speed for the next 8 seconds.
38. Graph B shows acceleration. The upward curve of the line indicates that an increasing distance is covered each second.
39. The object moved a distance of 300 m in 8 s. The object's average speed is 37.5 m/s. $\bar{v}$ = 300 m ÷ 8 s = 37.5 m/s