**9.** Which of the following statements is true for a ball thrown vertically upward?

    A. The ball has a negative acceleration on the way up and a positive acceleration on the way down.

    B. The ball has a positive acceleration on the way up and a negative acceleration on the way down.

    C. The ball has zero acceleration on the way up and a positive acceleration on the way down.

    D. The ball has a constant acceleration throughout its flight.

SHORT RESPONSE

10. In one or two sentences, explain the difference between *displacement* and *distance traveled.*

11. The graph below shows the position of a runner at different times during a run. Use the graph to determine the runner's displacement and average velocity:

    a. for the time interval from $t = 0.0$ min to $t = 10.0$ min

    b. for the time interval from $t = 10.0$ min to $t = 20.0$ min

    c. for the time interval from $t = 20.0$ min to $t = 30.0$ min

    d. for the entire run
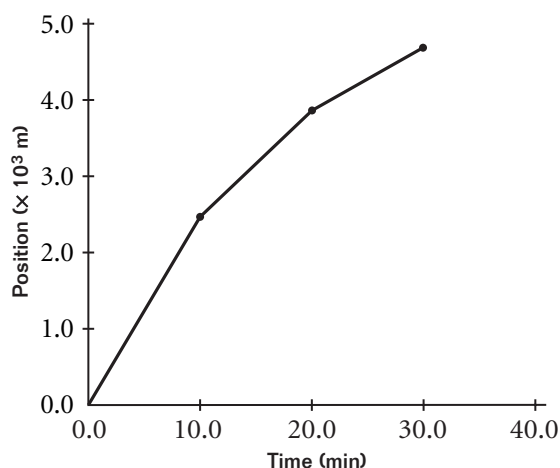
12. For an object moving with constant negative acceleration, draw the following:

    a. a graph of position vs. time

    b. a graph of velocity vs. time

    For both graphs, assume the object starts with a positive velocity and a positive displacement from the origin.

13. A snowmobile travels in a straight line. The snowmobile's initial velocity is $+3.0$ m/s.

    a. If the snowmobile accelerates at a rate of $+0.50$ m/s^2 for 7.0 s, what is its final velocity?

    b. If the snowmobile accelerates at the rate of -0.60 m/s^2 from its initial velocity of $+3.0$ m/s, how long will it take to reach a complete stop?

EXTENDED RESPONSE

14. A car moving eastward along a straight road increases its speed uniformly from 16 m/s to 32 m/s in 10.0 s.

    a. What is the car's average acceleration?

    b. What is the car's average velocity?

    c. How far did the car move while accelerating?

    Show all of your work for these calculations.

15. A ball is thrown vertically upward with a speed of 25.0 m/s from a height of 2.0 m.

    a. How long does it take the ball to reach its highest point?

    b. How long is the ball in the air?

    Show all of your work for these calculations.

Test TIP When filling in your answers on an answer sheet, always check to make sure you are filling in the answer for the right question. If you have to change an answer, be sure to completely erase your previous answer.