Date _____ Period _____ Name _____

CHAPTER 2 CHAPTER ASSESSMENT

REPRESENTING MOTION

Understanding Physics Concepts

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

_____ **1.** a system that defines the zero point of the variable you are studying

_____ **2.** the speed and direction of an object at a particular instant

_____ **3.** another term given for the size of a vector

_____ **4.** the location of an object relative to an origin

_____ **5.** $t_f - t_i$

_____ **6.** ratio of the change in position to the time interval during which the change occurred

_____ **7.** a zero point in a coordinate system

_____ **8.** a graph with time data on the horizontal axis and position data on the vertical axis

_____ **9.** a quantity with both magnitude and direction

_____ **10.** a series of images showing the position of a moving object over equal time intervals

_____ **11.** a vector that represents the sum of two or more other vectors

_____ **12.** the length of a vector that represents how far an object moved

_____ **13.** a quantity that only consists of a magnitude without a direction

_____ **14.** the location of an object at a particular instant

_____ **15.** $x_f - x_i$

_____ **16.** the absolute value of the slope on a position-time graph

_____ **17.** a simplified motion diagram that shows the object in motion as a series of points

a. motion diagram

b. particle model

c. coordinate system

d. origin

e. position

f. distance

g. magnitude

h. vector

i. scalar

j. resultant

k. time interval

l. displacement

m. position-time graph

n. instantaneous position

o. average velocity

p. average speed

q. instantaneous velocity

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

18. _____ In the particle model, the object in motion is represented by a series of *single points.*

19. _____ A time interval is the difference between two *locations.*

20. _____ A vector has both *location* and direction.

21. _____ The zero point in a coordinate system is called the *resultant.*

22. _____ A *scalar* is a measurement that does not have a direction.

Circle the letter of the choice that best completes the statement.

23. In the particle model, the object in the motion diagram is replaced by ____.

a. an arrow showing direction
b. a large dot
c. a series of single points
d. a scalar colored green

24. The length of the displacement vector represents how far an object ____.

a. can be thrown
b. is visible
c. traveled in one direction
d. can be stretched

25. Position-time graphs can be used to find the ____ of an object, as well as where and when two objects meet.

a. velocity and position
b. magnitude
c. gravity
d. time interval

26. The average speed is ____ the average velocity.

a. always slower than
b. the same as
c. the indirect value of
d. the absolute value of

27. The slope of an object's position-time graph is the ____ of the object.

a. distance
b. displacement
c. velocity
d. position

28. An object's velocity is how fast it is moving and ____.

a. its initial position
b. in what direction it is moving
c. how far it has been
d. its instantaneous position

Thinking Critically

Answer the following questions. Show your calculations.

1. A girl rides her bike at 15 m/s for 20 s. How far does she travel in that time?

2. How fast would the girl in the previous problem have been traveling if she had covered the same distance in 11 seconds?

3. Refer to the chart below that has data about a moving object to answer questions a–e.

Time Elapsed	0.0 s	1.0 s	2.0 s	3.0 s	4.0 s	5.0 s
Distance Traveled	0.0 m	10.0 m	20.0 m	30.0 m	40.0 m	80.0 m

a. What is the elapsed time between the 0-m mark and the 40-m mark?

b. How large is the average velocity of the object for the interval from 0–5 s?

c. How does the interval of 3–4 s compare with the interval from 4–5 s in terms of distance?

d. How does the interval of 0–4 s compare with the interval from 4–5 s in terms of distance?

e. Draw a position-time graph based on the data in the chart above.

4. You are planning a bicycle trip for which you want to average 24 km/h. You cover the first half of the trip at an average speed of 21 km/h. What must your average speed be in the second half of the trip to meet your goal?

5. You have 6.0 hours to travel a distance of 140 km by bicycle.

a. How long will it take you to travel the first half at an average speed of 21 km/h?

b. In the second half of the ride, you need to increase your average speed to make up for lost time. If you can maintain an average speed of 25 km/h, will you be able to reach your destination on time?

c. Show your calculations for the average speed you need to maintain in the second half of the bike ride to make up for lost time.

d. Draw a position-time graph for the bicycle trip. Show your position at 20-minute intervals.

Applying Physics Knowledge

Answer the following questions. Use complete sentences.

1. When viewing a scene on a DVD in frame-by-frame mode, how can you tell if an object in the frame is moving?

_____

_____

_____

_____

2. How can an object have a negative position?

_____

_____

_____

3. Explain how a moving object could have a motion diagram that is the same as that of an object at rest.

_____

_____

_____

_____

4. What is meant when an object is described as having a velocity of +15 m/s?

_____

_____

_____

_____

Solve the following problems. Show your calculations.

5. If light travels at 3.00×10^8 m/s, how long will it take light from the sun to reach a planet that is 6.45 light years away? How far will the light have traveled in meters? (Use a value of exactly 365 days for a year.)

6. If runner A is running at 7.50 m/s and runner B is running at 7.90 m/s, how long will it take runner B to catch runner A if runner A has a 55.0-m head start?

7. A missile is fired and travels at 309 m/s. If the operator discovers that the missile is locked on the wrong target and must be detonated by remote signal before impact, how far will the missile travel if the operator's reaction time to send the signal is 1.21 s?

8. Trying to be on time for class, a girl moves at 2.4 m/s down a 52 m-long hallway, 1.2 m/s down a much more crowded hallway that is 79 m long, and the last 25 m to her class at 3.4 m/s. How long does it take her to reach her class?

9. A canoeist is trying to paddle upstream in a river that has a velocity of 6.1 m/s. If he can paddle his canoe at a velocity of 6.2 m/s will he make any headway? What will his velocity relative to the shore be?