

Motion in One Dimension

MULTIPLE CHOICE On the line at the left of each statement, write the letter of the choice that best completes the statement or answers the question.

1. _____ Which of the following is the expression for average velocity?

a. $v_{avg} = \frac{\Delta x}{\Delta t}$

c. $v_{avg} = \Delta x \cdot \Delta t$

b. $v_{avg} = \frac{\Delta t}{\Delta x}$

d. $v_{avg} = \frac{x_i - x_f}{t_i - t_f}$

2. _____ Velocity measures all of the following EXCEPT

- a. the speed of an object.
- b. the total displacement of an object.
- c. the direction of an object's motion.
- d. the displacement for each time interval.

3. _____ Acceleration is

- a. displacement.
- b. the rate of change of displacement.
- c. velocity.
- d. the rate of change of velocity.

4. _____ Which of the following is the expression for average acceleration?

a. $a_{avg} = \frac{\Delta t}{\Delta v}$

c. $a_{avg} = \Delta t \cdot \Delta v$

b. $a_{avg} = \frac{\Delta v}{\Delta t}$

d. $a_{avg} = \frac{v_i - v_f}{t_i - t_f}$

5. _____ When velocity is zero and acceleration is negative, what happens to the object's motion?

- a. The object slows down.
- b. The object speeds up from a negative velocity.
- c. Nothing happens to the object.
- d. The object speeds up from rest.

6. _____ Which of the following is a value for the acceleration of objects in free fall?

a. 9.81 m/s^2

c. 9.80 m/s^2

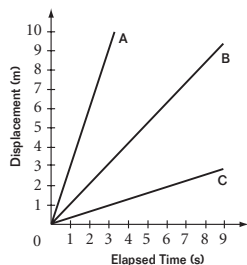
b. -9.81 m/s^2

d. -9.80 m/s^2

7. _____ The baseball catcher throws a ball vertically upward and catches it in the same spot as it returns to the mitt. At what point in the ball's path does it experience zero velocity and nonzero acceleration at the same time?
- midway on the way up
 - at the top of its trajectory
 - the instant it leaves the catcher's hand
 - the instant before it arrives in the catcher's mitt
8. _____ When there is no air resistance, objects of different masses
- fall with equal accelerations with similar displacements.
 - fall with different accelerations with different displacements.
 - fall with equal accelerations with different displacements.
 - fall with different accelerations with similar displacements.
9. _____ Which would fall with greater acceleration in a vacuum, a leaf or a stone?
- the leaf
 - the stone
 - They would accelerate at the same rate.
 - It is difficult to determine without more information.
10. _____ A dolphin can swim 1.85 km/h. How far does the dolphin travel after 0.60 h?
- | | |
|-----------|------------|
| a. 1.1 km | c. 0.63 km |
| b. 2.5 km | d. 3.7 km |
11. _____ A cheetah can maintain its maximum speed of 27.8 m/s for only 30.0 s. What is the minimum distance a gazelle running at 22.2 m/s must be ahead of the cheetah to have a chance of escaping?
- | | |
|------------|-----------|
| a. 100.0 m | c. 70.0 m |
| b. 168 m | d. 83.0 m |
12. _____ A toy car is given an initial velocity of 5.0 m/s and experiences a constant acceleration of 2.0 m/s^2 . What is the final velocity after 6.0 s?
- | | |
|-------------|-----------|
| a. 10.0 m/s | c. 16 m/s |
| b. 12 m/s | d. 17 m/s |
13. _____ A marble accelerates from rest at a constant rate and travels for a total displacement of 44 m in 20.0 s. What is the average velocity of the marble?
- | | |
|------------|------------|
| a. 1.1 m/s | c. 4.4 m/s |
| b. 2.2 m/s | d. 0.0 m/s |

Chapter
2 **HOLT PHYSICS**
Test A *continued*

PROBLEM Write your answer to the question on the line to the left and show your work in the space provided.



18. _____ The graph above shows displacement versus time. What is the average velocity for line A?

GRAPH

Displacement (m)	Time (s)
1.0	2.0
2.0	4.0
3.0	6.0
4.0	8.0
5.0	10.0

19. Construct a graph of position versus time using the data in the table above. What value is represented by the slope of a graph? Find the slope between $\Delta t = 1$ s and $\Delta t = 2$ s. Be sure to use appropriate SI units.



20. A motorized scooter starts at rest and accelerates for 4 s at 2 m/s^2 . It continues at a constant speed for 6 s. Graph velocity versus time to describe this motion.



Motion in One Dimension

MULTIPLE CHOICE On the line at the left of each statement, write the letter of the choice that best completes the statement or answers the question.

- _____ What is the speed of an object at rest?
 - 0.0 m/s
 - 1.0 m/s
 - 9.8 m/s
 - 9.81 m/s
- _____ In addition to displacement, which of the following must be used for a more complete description of the average velocity of an object?
 - m
 - kg
 - Δt
 - Δx
- _____ Which of the following is the expression for average acceleration?
 - $a_{avg} = \frac{\Delta t}{\Delta v}$
 - $a_{avg} = \frac{\Delta v}{\Delta t}$
 - $a_{avg} = \Delta t \cdot \Delta v$
 - $a_{avg} = \frac{v_i - v_f}{t_i - t_f}$
- _____ When velocity is positive and acceleration is negative, what happens to the object's motion?
 - The object slows down.
 - The object speeds up.
 - Nothing happens to the object.
 - The object remains at rest.
- _____ If a baseball has a negative velocity and a negative acceleration, the velocity
 - increases.
 - decreases.
 - slows to rest.
 - speeds up from rest.
- _____ Which of the following units are used to measure acceleration during free fall?
 - m/s
 - m/s^2
 - $m \cdot s$
 - m^2/s^2
- _____ Acceleration due to gravity is also called
 - negative velocity.
 - displacement.
 - free-fall acceleration.
 - instantaneous velocity.

8. _____ The baseball catcher throws a ball vertically upward and catches it in the same spot as it returns to the mitt. At what point in the ball's path does it experience zero velocity and nonzero acceleration at the same time?
- midway on the way up
 - at the top of its trajectory
 - the instant it leaves the catcher's hand
 - the instant before it arrives in the catcher's mitt
9. _____ Which would hit the ground first if dropped from the same height in a vacuum, a feather or a metal bolt?
- the feather
 - the metal bolt
 - They would hit the ground at the same time.
 - They would be suspended in a vacuum.
10. _____ Which would fall with greater acceleration in a vacuum, a leaf or a stone?
- the leaf
 - the stone
 - They would accelerate at the same rate.
 - It is difficult to determine without more information.
11. _____ A hiker travels south along a straight path for 1.5 h with an average velocity of 0.75 km/h, then travels south for 2.5 h with an average velocity of 0.90 km/h. What is the hiker's displacement for the total trip?
- | | |
|------------------------|------------------------|
| a. 1.1 km to the south | c. 3.4 km to the south |
| b. 2.2 km to the south | d. 6.7 km to the south |
12. _____ A trucker drives with an average velocity of 27 m/s toward the east on a perfectly straight highway. What will the trucker's displacement be after 2.0 h?
- | | |
|-------------------------------------|-------------------------------------|
| a. 97 km to the east | c. 1.6×10^2 km to the east |
| b. 1.9×10^2 km to the east | d. 3.2×10^2 km to the east |
13. _____ A shopping cart is given an initial velocity of 2.0 m/s and experiences a constant acceleration of 3.0 m/s^2 . What is the magnitude of the cart's displacement after the first 4.0 s of its motion?
- | | |
|-----------|-----------|
| a. 10.0 m | c. 32 m |
| b. 55 m | d. 80.0 m |
14. _____ A soccer ball is kicked horizontally. What is its average speed if after 4.00 s its displacement is 21.0 m?
- | | |
|-------------|-------------|
| a. 5.25 m/s | c. 14.4 m/s |
| b. 8.75 m/s | d. 0.00 m/s |

Chapter
2

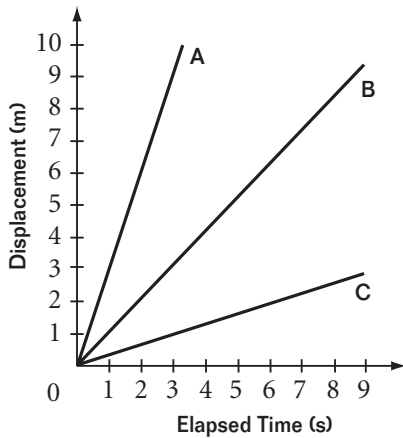
HOLT PHYSICS
Test B *continued*

- 15.** _____ Human reaction time is usually about 0.20 s. If your lab partner holds a ruler between your finger and thumb and releases it without warning, how far can you expect the ruler to fall before you catch it? (Disregard air resistance. $g = 9.81 \text{ m/s}^2$.)
- a. at least 4.0 cm
 - b. at least 9.8 cm
 - c. at least 16.0 cm
 - d. at least 19.6 cm

SHORT ANSWER Write the answer to the following question in the space provided.

- 16.** What is the acceleration of an object thrown upward? What is its acceleration as it free falls?

PROBLEM Write your answers to the questions on the line to the left and show your work in the space provided.



- 17.** _____ The graph above shows displacement versus time. What is the average velocity for line B?

Chapter
2

HOLT PHYSICS
Test B *continued*

- 18.** _____ A pair of spectacles is dropped from the top of a 32.0 m high stadium. A pen is dropped 2.0 s later. How high above the ground is the pen when the spectacles hit the ground? (Disregard air resistance. $g = 9.81 \text{ m/s}^2$.)

GRAPH

<u>Displacement (m)</u>	<u>Time (s)</u>
2.0	0.0
3.5	4.5
6.0	10.0

- 19.** Construct a graph of position versus time using the data in the table above. What value is represented by the slope of a graph? Find the slope between $\Delta t = 1 \text{ s}$ and $\Delta t = 2 \text{ s}$. Be sure to use appropriate SI units.



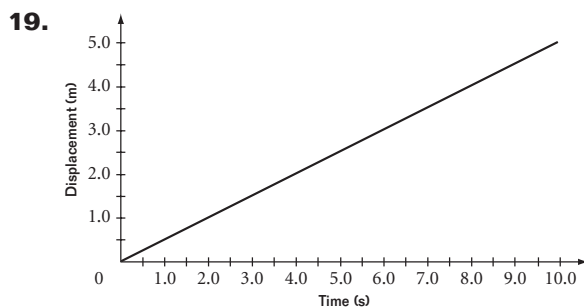
- 20.** A motorized scooter starts at rest and accelerates for 4 s at 2 m/s^2 . It continues at a constant speed for 6 s. Graph velocity versus time to describe this motion.



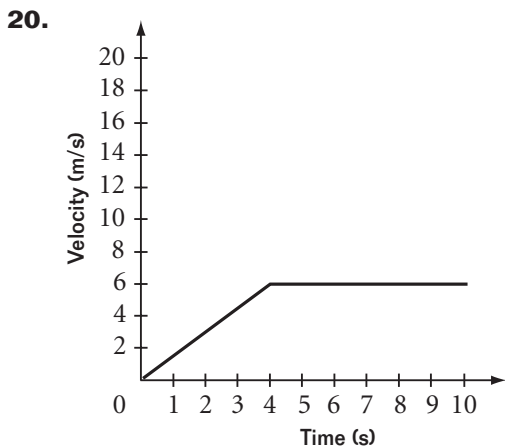
Chapter 2 Test Form A

1. A
2. B
3. D
4. B
5. D
6. B
7. B
8. A
9. C
10. A
11. B
12. D
13. B
14. C
15. A
16. Free fall is the motion of an object falling with a constant acceleration in the absence of air resistance.
17. The direction of the free-fall acceleration is negative because the object accelerates toward Earth (the usual choice of coordinates uses positive as the direction away from the Earth).

18. 3.0 m/s



velocity, 0.5 m/s



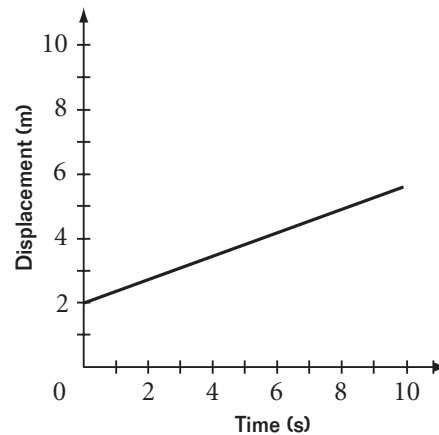
Chapter 2 Test Form B

1. A
2. C
3. B
4. A
5. B
6. B
7. C
8. B
9. C
10. C
11. C
12. B
13. C
14. A
15. D
16. The direction of the free-fall acceleration is negative because the object accelerates toward Earth (the usual choice of coordinates uses positive as the direction away from the Earth).

17. 1.0 m/s

18. 3.0×10^1 m

19.



20.

