1 A baseball player runs 27.4 meters from the batter's box to first base, overruns first base by 3.0 meters, and then returns to first base. Compared to the total distance traveled by the player, the magnitude of the player's total displacement from the batter's box is
   (1) 3.0 m shorter  (3) 3.0 m longer
   (2) 6.0 m shorter  (4) 6.0 m longer

2 A student throws a baseball vertically upward and then catches it. If vertically upward is considered to be the positive direction, which graph best represents the relationship between velocity and time for the baseball? [Neglect friction.]

   ![Graphs](1)(2)(3)(4)

3 A car traveling on a straight road at 15.0 meters per second accelerates uniformly to a speed of 21.0 meters per second in 12.0 seconds. The total distance traveled by the car in this 12.0-second time interval is
   (1) 36.0 m  (3) 216 m
   (2) 180 m  (4) 252 m

4)

   Scalar is to vector as
   (1) speed is to velocity
   (2) displacement is to distance
   (3) displacement is to velocity
   (4) speed is to distance
A car, initially traveling east with a speed of 5.0 meters per second, is accelerated uniformly at 2.0 meters per second$^2$ east for 10. seconds along a straight line. During this 10.-second interval the car travels a total distance of

(1) 50. m  
(2) 60. m  
(3) $1.0 \times 10^2$ m  
(4) $1.5 \times 10^2$ m

6 What is the approximate diameter of an inflated basketball?

(1) $2 \times 10^{-2}$ m  
(2) $2 \times 10^{-1}$ m  
(3) $2 \times 10^0$ m  
(4) $2 \times 10^1$ m

7 The graph below shows the relationship between the speed and elapsed time for an object falling freely from rest near the surface of a planet.

![Speed vs. Time Graph](image)

What is the total distance the object falls during the first 3.0 seconds?

(1) 12 m  
(2) 24 m  
(3) 44 m  
(4) 72 m
Base your answers to questions 8 and 9 on the information below.

In a drill during basketball practice, a player runs the length of the 30-meter court and back. The player does this three times in 60 seconds.

![Diagram](image)

(Not drawn to scale)

8 The magnitude of the player’s total displacement after running the drill is
   (1) 0.0 m                      (3) 60. m
   (2) 30. m                      (4) 180 m

9 The average speed of the player during the drill is
   (1) 0.0 m/s                    (3) 3.0 m/s
   (2) 0.50 m/s                   (4) 30. m/s

10) A child riding a bicycle at 15 meters per second accelerates at −3.0 meters per second squared for 4.0 seconds. What is the child’s speed at the end of this 4.0-second interval?
    (1) 12 m/s                     (3) 3.0 m/s
    (2) 27 m/s                     (4) 7.0 m/s

11 A ball is thrown vertically upward with an initial velocity of 29.4 meters per second. What is the maximum height reached by the ball? [Neglect friction.]
    (1) 14.7 m                    (3) 44.1 m
    (2) 29.4 m                    (4) 88.1 m
12) For the given velocity-time graph which of the following statements are true:

- The body has no initial velocity with uniform acceleration.
- The body has some initial velocity, with no acceleration or retardation.
- The body has some initial velocity with uniform acceleration.
- The body has zero initial velocity with no acceleration.

13) In the graphs below which one represents a body moving with higher acceleration?
For the given velocity-time graph which of the following statements are true?

a. The body has a uniform acceleration and its initial velocity is zero.
b. The body has some initial velocity and undergoes uniform acceleration.
c. The body has zero initial velocity and it has a variable acceleration.
d. The body has some initial velocity and undergoes uniform deceleration.

The graph below shows the total distance a person jogged on Thursday over a period of time. What was his average speed for the whole journey?
16) Which of the following graphs is not possible? Explain why?

(A) ![Graph A](image)
(B) ![Graph B](image)
(C) ![Graph C](image)
(D) ![Graph D](image)

17) A body moves with uniform velocity. Which of the graphs shown here is a graph of displacement against time?

(A) ![Graph A](image)  (B) ![Graph B](image)  (C) ![Graph C](image)  (D) ![Graph D](image)

18) For the objects shown in the graph, which is fastest?

- [ ] A
- [ ] B
- [ ] C

Distance (m)

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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Time (s)
19) What is the average velocity of a car that goes 120 m in 20 seconds?
   a) 120 m/s
   b) 0.17 m/s
   c) 2,400 m/s
   d) 21,400 m/s
   e) 6 m/s

20) The first graph shows distance vs. time for an object. Which one of the other graphs shows velocity vs. time for the same object?

21) If a car is going 10 m/s and 4 seconds later it is going 18 m/s, what is its acceleration?
   a) 2 m/s²
   b) 18 m/s²
   c) 8 m/s²
   d) 2 m/s²
   e) 0.5 m/s

22) In the preceding question, what is the car’s average velocity over that period?
   a) 4.5 m/s
   b) 2.5 m/s
   c) 2 m/s
   d) 14 m/s
   e) 8 m/s

23)
24) What is the acceleration of a ball rolling down a ramp that starts from rest and travels 0.9 m in 3 s?
   a) 0.1 m/s/s
   b) 0.2 m/s/s
   c) 0.3 m/s/s
   d) 2.7 m/s/s
   e) 3.3 m/s/s

25) As an object falls downward (neglecting air resistance), its
   a) velocity remains constant while acceleration increases
   b) velocity decreases while acceleration increases
   c) velocity increases and acceleration increases.
   d) velocity and acceleration remain constant
   e) velocity increases and acceleration remains constant.

26) Which has zero acceleration? An object
   a) at rest.
   b) moving at constant velocity.
   c) moving at a constant speed in a straight line.
   d) all of these.
   e) none of these.