**Q1** Starting from rest, a car uniformly accelerates to a speed of 7.60 m/s in a time of 3.00 s. Through what distance does the cart move in this time?

a 22.8 m   c 16.1 m   e 5.7 m

b 11.4 m   d 8.1 m

Q2 A car travels at 20.0 mile/h. Which one of the following choices best represents the speed of the car in SI units of meter per second (m/s)?

a 0.75 m/s   c 533 m/s   e 8.9 m/s

b 45.0 m/s   d 20.0 m/s

Q3 A cart travels with a constant nonzero acceleration along a straight line. Which graph best represents the relationship between the distance the cart travels and the time of travel?
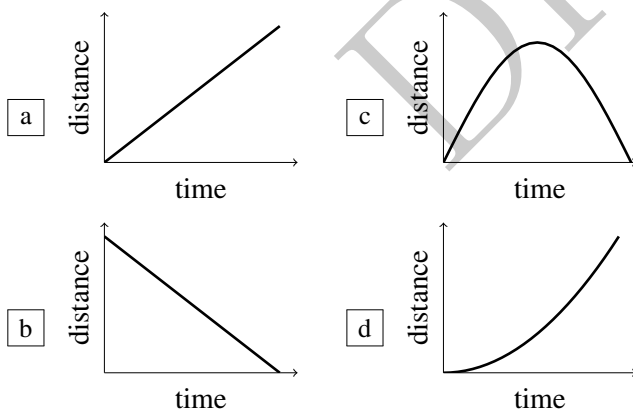

Q4 A cart is initially moving at 0.5 m/s along a track. The cart comes to rest after traveling 1 m. The experiment is repeated on the same track, but now the cart is initially moving at 1 m/s. How far does the cart travel before coming to rest?

a 5 m   c 4 m   e 3 m

b 1 m   d 2 m

Q5 A rectangular plate has a length of 47 in and a width of 20 in. What is the area of the plate?

a 1.29×10^{-2} m^2 d $1.21 \times 10^{+1}$ m^2

b $2.85 \times 10^{+1}$ m^2 e 3.91×10^{-4} m^2

c 6.06×10^{-1} m^2 f $2.39 \times 10^{+1}$ m^2

Q6 The graph shown below is a plot of the car's velocity in the x direction, v_x, versus time, t.
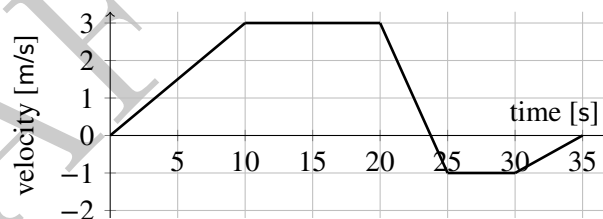
During what time interval was the car moving towards its initial position at constant velocity?

a 20 s to 25 s   d 10 s to 20 s

b 25 s to 30 s   e 30 s to 35 s

c 0 s to 10 s

Q7 A rock falls freely from rest near the surface of a planet where the acceleration due to gravity is 4.0 m/s^2. What is the speed of this rock after it falls 32 m?
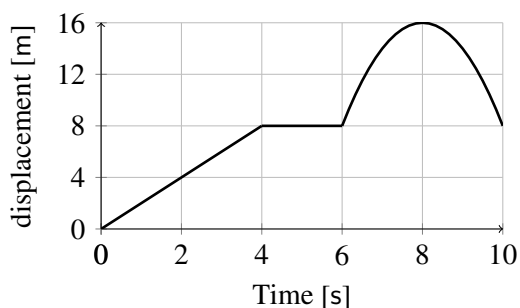
a 32 m/s   c 16 m/s

b 25 m/s   d 8.0 m/s

Q8 A 1000 kg car traveling with a velocity of $+20$ m/s decelerates at -5.0 m/s^2 until it comes to rest. What is the total distance the car travels as it decelerates to rest?

a 40 m   c 80 m

b 10 m   d 20 m
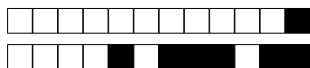
Q9 The graph below represents the displacement of an object moving in a straight line as a function of time.

What was the total distance traveled by the object during the 10 s time interval?

a 16 m   c 8 m

b 24 m   d 0 m

Q10 A rectangular building lot measures 90 ft by 66 ft. What is the area of the lot?

a $6.13 \times 10^0 \, \text{m}^2$ d $5.13 \times 10^{+1} \, \text{m}^2$

b $5.94 \times 10^{+3} \, \text{m}^2$ e $1.81 \times 10^{+3} \, \text{m}^2$

c $3.64 \times 10^{+4} \, \text{m}^2$ f $5.52 \times 10^{+2} \, \text{m}^2$

Q11 Suppose two cars are racing on a circular track 1 km in circumference. The first car can circle the track in 15 s at top speed while the second car can circle the track in 12 s at top speed. How much lead does the first car need starting the last lap of the race not to lose?

a at least 104 m   d at least 83 m

b at least 200 m   e at least 250 m

c at least 67 m

Q12 A ball dropped from a bridge takes 3.0 s to reach the water below. How far is the bridge above the water?

a 44 m   c 29 m

b 88 m   d 15 m

Q13 The graph below represents the relationship between speed and time for an object moving along a straight line.
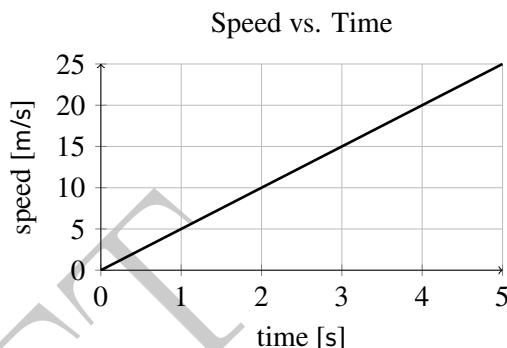
What is the total distance traveled by the object during the first 4 s?

a 40 m   c 20 m

b 5 m   d 80 m

Q14 A toy car moves 0.80 m in 1.0 s at the constant velocity. If it continues, how far will it travel in 3.0 s?

a 2.4 m   c 3.6 m   e 7.2 m

b 14.4 m   d 4.8 m
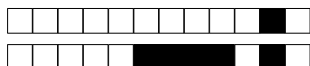
Physics Assessment

Last and First Name: Today's Date:

Enter your student number, your full name, and today's date in the provided space. Questions using the sign ♣ may have zero, one or several correct answers. Other questions have a single correct answer. Select your response by filling the appropriate box. The use of an HB or #2 pencil is preferred, but not required. The use of external reference material or electronic communication devices is prohibited.

Q1 The position-time, y vs. t, graph for the motion of an object is shown.
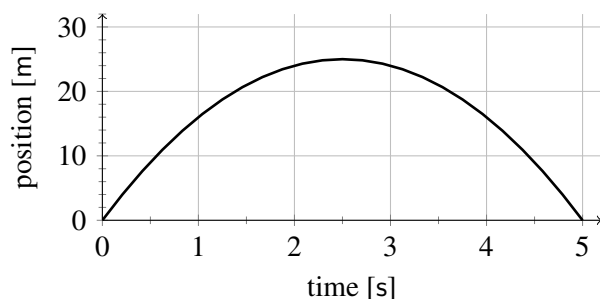
What would be a reasonable equation for the acceleration a that would account for this motion?

- a a = negative constant times t
- b $a = 0$
- c a = positive constant
- d a = positive constant times t
- e a = negative constant

Q2 An object is dropped from rest and falls freely 20 m to Earth. When is the speed of the object 9.8 m/s?

- a after it has fallen 9.8 m
- b at the end of its first second of fall
- c during the entire first second of its fall
- d during its entire time of fall

Q3 Car A, moving in a straight line at a constant speed of 20.0 m/s, is initially 200 m behind car B, moving in the same straight line at a constant speed of 15 m/s. How far must car A travel from this initial position before it catches up with car B?

- a 400 m
- b 200 m
- c 1000 m
- d 800 m

Q4 A vehicle completes one lap around a circular track at an average speed of 50 m/s and then completes a second lap at an average speed of V. The average speed of the vehicle for the completion of both laps was 80 m/s. What was the average speed V of the second lap?

- a 110 m/s
- c 125 m/s
- e 200 m/s
- b 150 m/s
- d 100 m/s

Q5 A race car starting from rest accelerates uniformly at a rate of 4.9 m/s². What is the car's speed after it has traveled 200 m.

- a 31.3 m/s
- c 44.3 m/s
- b 62.6 m/s
- d 1960 m/s

Q6 If a car accelerates uniformly from rest to 15 m/s over a distance of 100 m, the magnitude of a car's acceleration is:

- a 0.15 m/s²
- c 2.3 m/s²
- b 1.1 m/s²
- d 6.7 m/s²

Q7 A baseball dropped from the roof of a tall building takes 3.1 s to hit the ground. How tall is the building? [Neglect friction.]

- a 30 m
- c 47 m
- b 94 m
- d 15 m

Q8 Which object weighs approximately 1 N?

- a paper clip
- c golf ball
- b physics student
- d dime
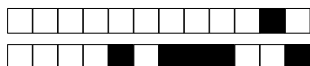
Q9 Is it possible for an object's velocity to increase while its acceleration decreases?

- a Yes, an example would be a falling object in the presence of air resistance
- b Yes, an example would be a falling object near the surface of the moon.
- c No, this is impossible because of the way in which acceleration is defined.
- d No, because if acceleration is decreasing the object will be slowing down.
- e No, because velocity and acceleration must always be in the same direction.

Q10 An object of mass 5.00 kg moves only to the right along the $+x$-axis. During some time interval, the object's speed increased from 4.00 m/s to 8.00 m/s with a constant acceleration of 2.00 m/s^2. Through what distance does the object move during the time interval of the acceleration?

- a 24.0 m
- b 2.00 m
- c 12.0 m
- d 4.00 m
- e 8.00 m

**Q11** A swimming pool holds 580 000 gallons of water. How much water is that equivalent to in SI units?

- a $2.20 \times 10^{+1}$ m^3
- b $2.20 \times 10^{+7}$ m^3
- c $8.31 \times 10^{+3}$ m^3
- d $3.15 \times 10^{+4}$ m^3
- e $5.80 \times 10^{+2}$ m^3
- f $2.20 \times 10^{+3}$ m^3

Q12 A fish tank has internal dimension of 28 in long, 18 in wide, and 18 in high. What is the maximum amount of water that the fish tank can hold?

- a 4.88×10^{-1} m^3
- b 3.78×10^{-3} m^3
- c 5.85×10^{0} m^3
- d $9.07 \times 10^{+3}$ m^3
- e 1.49×10^{-1} m^3
- f 1.60×10^{0} m^3

Q13 The velocity vs. time graph for the motion of a car on a straight track is shown in the diagram. The thick line represents the velocity. Assume that the car starts at the origin $x = 0$.
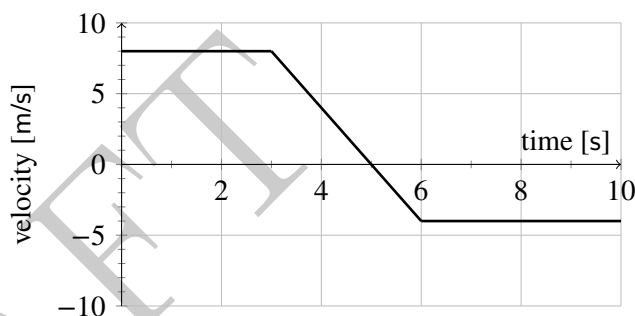
What is the average speed of the car for the 10 s interval?

- a 5.00 m/s
- b 3.30 m/s
- c 1.20 m/s
- d 5.40 m/s
- e 1.40 m/s

Q14 Two automobiles are 150 km apart and traveling toward each other. One automobile is moving at 60 km/h and the other is moving 40 km/h. In how many hours will they meet?

- a 1.75 h
- b 2.5 h
- c 3.0 h
- d 1.5 h
- e 2.0 h