

A deer walks 1300 m east to a creek for a drink. The deer then walked 500 m west to the berry patch for dinner, before running 300 m west when startled by a loud raccoon. What is the deer's displacement?

Which are vector quantities?

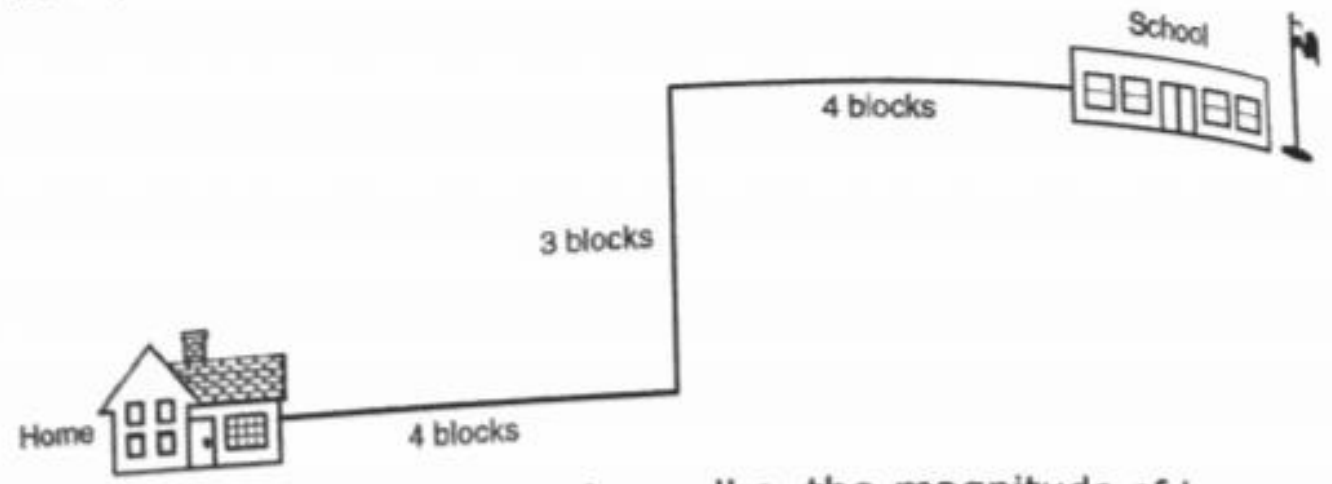
(A) speed

(B) position

(C) mass

(D) displacement

A student on her way to school walks four blocks east, three blocks north, and another four blocks east, as shown in the diagram.



Compared to the distance she walks, the magnitude of her displacement from home to school is

- (A) less
- (B) greater
- (C) the same

A hiker walks 5 kilometers due north and then 7 kilometers due east. What is the magnitude of her resultant displacement? What total distance has she traveled?

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Chuck the hungry squirrel travels 4m east and 3m north in search of an acorn. The entire trip takes him 20 seconds. Find: Chuck's distance traveled, Chuck's displacement, Chuck's average speed, and Chuck's average velocity.



On a highway, a car is driven 80 kilometers during the first 1.00 hour of travel, 50 kilometers during the next 0.50 hour, and 40 kilometers in the final 0.50 hour. What is the car's average speed for the entire trip?

- (A) 45 km/h
- (B) 60 km/h
- (C) 85 km/h
- (D) 170 km/h



A person walks 150 meters due east and then walks 30 meters due west. The entire trip takes the person 10 minutes. Determine the magnitude and the direction of the person's total displacement.

An athlete runs 3 kilometers at a constant speed of 5 meters per second and then 7 kilometers at a constant speed of 14.4 km/hr. What is the average speed of the runner during her 10 km run?

- (A) 0.52 m/s
- (B) 1.94 m/s
- (C) 4.26 km/hr
- (D) 15.3 km/hr

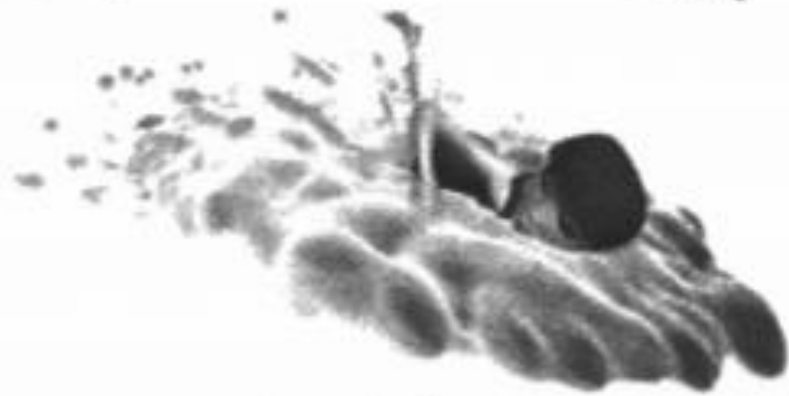


A motorcycle travels 500 m south in 90 seconds, then 300 m east in 60 seconds. What is the magnitude of the motorcycle's average velocity?

- (A) 1.33 m/s
- (B) 3.89 m/s
- (C) 5.33 m/s
- (D) 6.48 m/s

A swimmer swims three-fifths the width of a river at one velocity (v), then swims the remainder of the river at half her initial velocity ($\frac{1}{2}v$). What was her average speed swimming across the river?

- (A) $0.71v$
- (B) $0.75v$
- (C) $0.80v$
- (D) $0.88v$



Rush, the crime-fighting superhero, can run at a maximum speed of 30 m/s, while Evil Eddie, the criminal mastermind, can run 5 m/s. If Evil Eddie is 500 meters ahead of Rush:

- A) How much time does Evil Eddie have to devise an escape plan?
- B) How far must Rush run to capture Evil Eddie?

Monty the Monkey accelerates uniformly from rest to a velocity of 9 m/s in a time span of 3 seconds. Calculate Monty's acceleration.



Velocity is to speed as displacement is to

(A) acceleration

(B) time

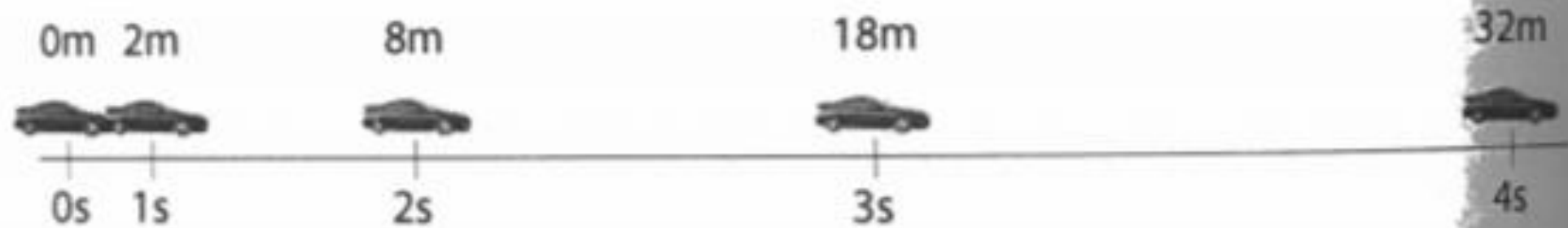
(C) momentum

(D) distance

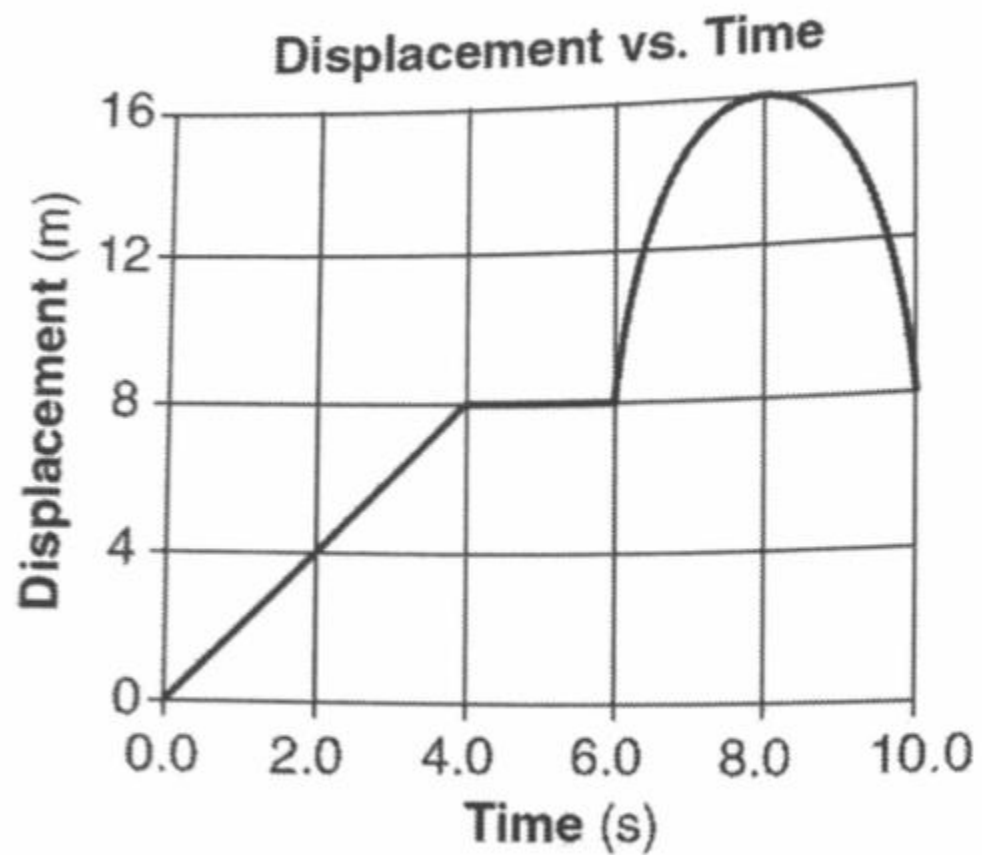
The instant before a batter hits a 0.14-kilogram baseball, the velocity of the ball is 45 meters per second west. The instant after the batter hits the ball, the ball's velocity is 35 meters per second east. The bat and ball are in contact for 1.0×10^{-2} second. Determine the magnitude and direction of the average acceleration of the baseball while it is in contact with the bat.



The diagram below shows a car beginning from rest and accelerating uniformly down the road.

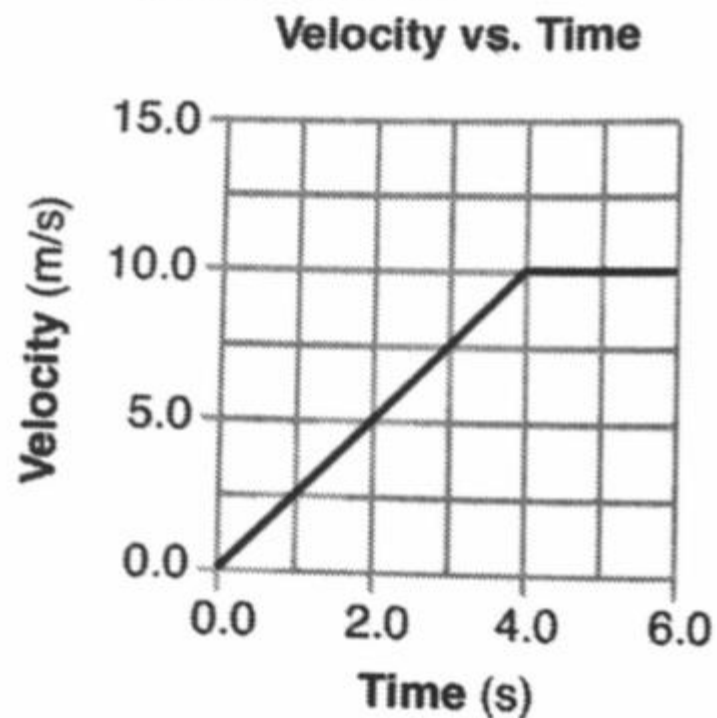


What is the average speed of the car between 2 and 4 seconds?



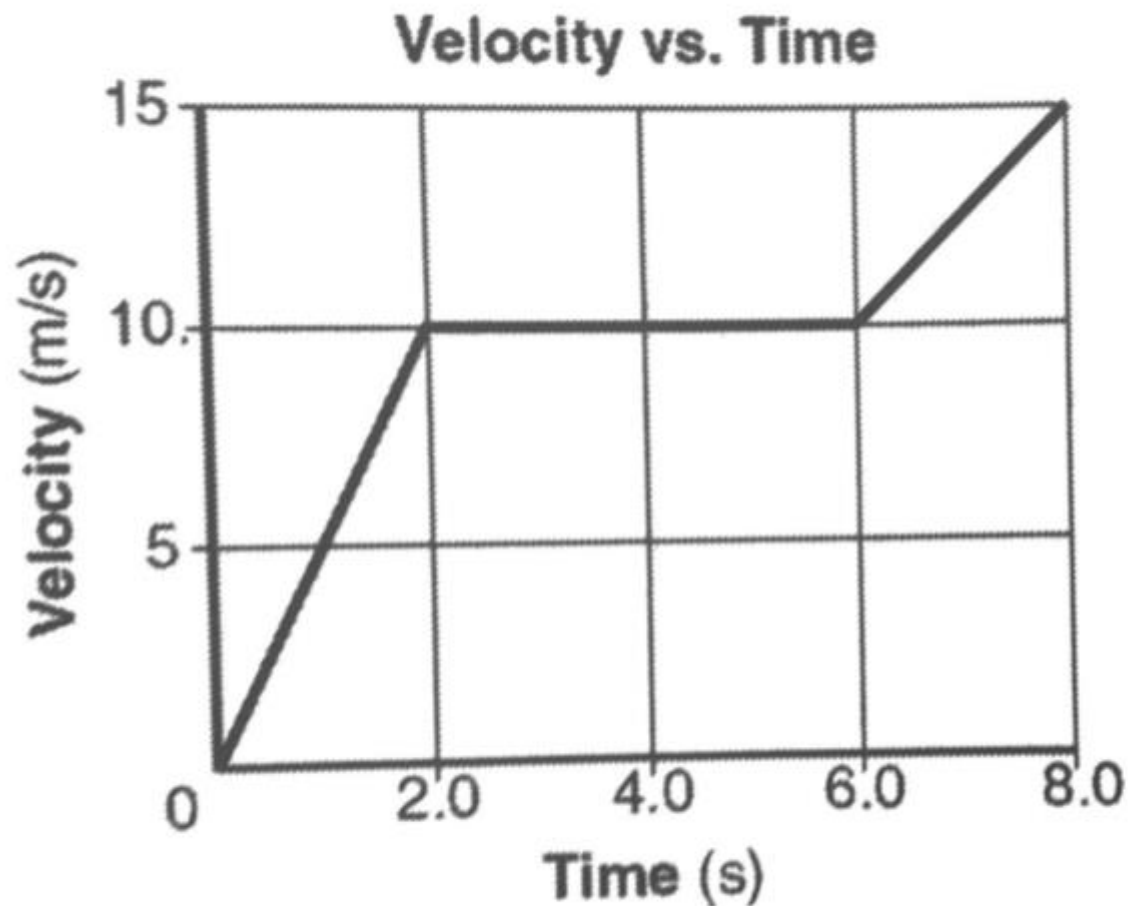
What was the total distance traveled by the object during the 10-second time interval?

The graph below represents the motion of a car during a 6.0-second time interval.



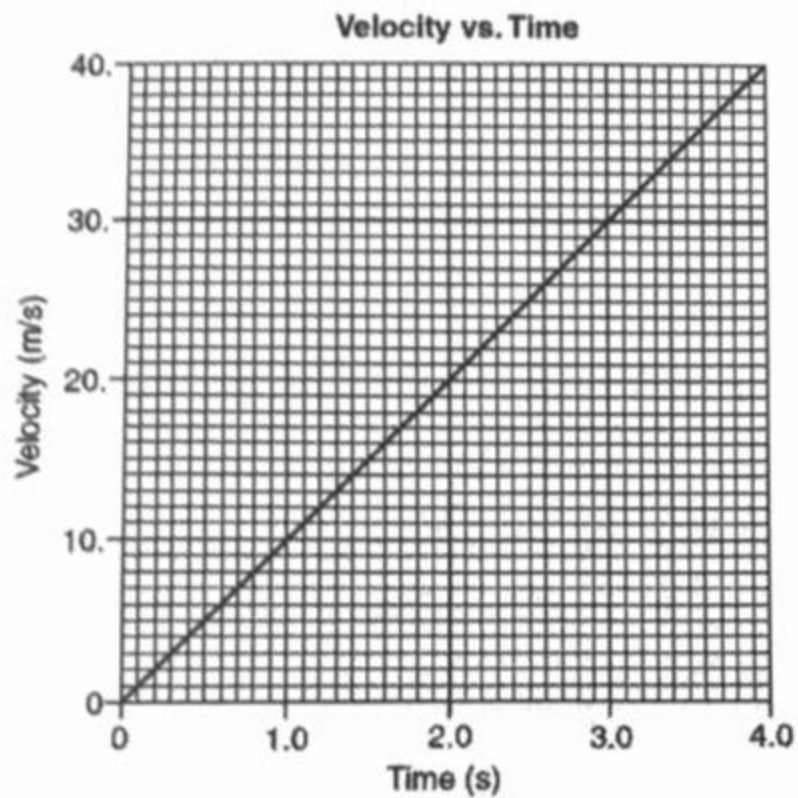
- (A) What is the total distance traveled by the car during this 6-second interval?
- (B) What is the acceleration of the car at $t = 5$ seconds?

The graph below represents the velocity of an object traveling in a straight line as a function of time.



Determine the magnitude of the total displacement of the object at the end of the first 6.0 seconds.

The graph below shows the velocity of a race car moving along a straight line as a function of time.

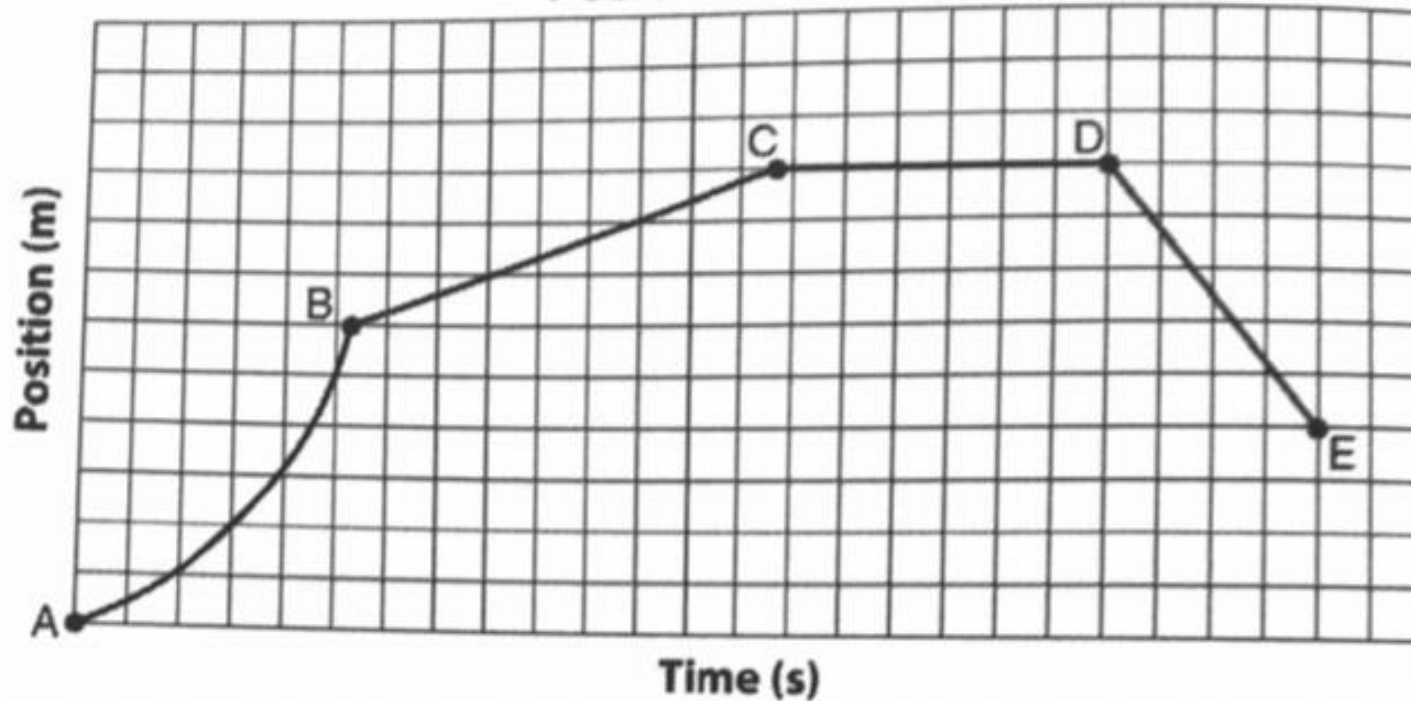


What is the magnitude of the displacement of the car from $t = 2.0$ seconds to $t = 4.0$ seconds?

- (A) 20 m
- (B) 40 m
- (C) 60 m
- (D) 80 m

The displacement-time graph below represents the motion of a cart initially moving forward along a straight line.

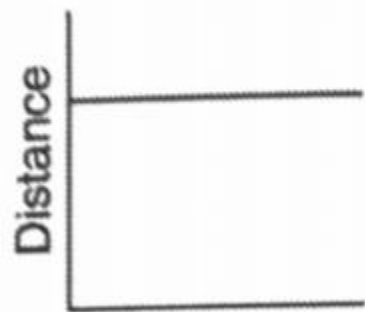
Position vs. Time



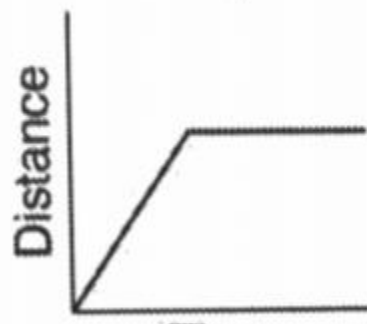
During which interval is the cart moving forward at constant speed?

- (A) AB
- (B) BC
- (C) CD
- (D) DE

Which graph best represents the motion of a block accelerating uniformly down an inclined plane?



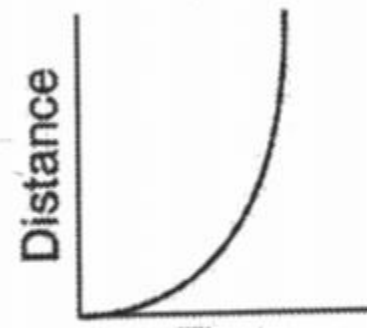
(1)



(3)



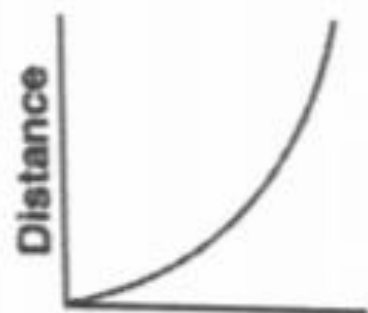
(2)



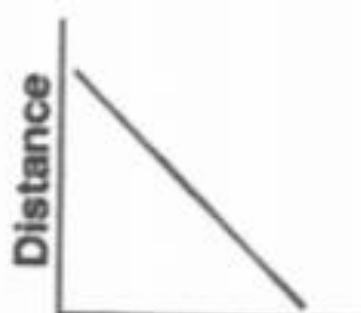
(4)

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?

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 time of travel?



(1)



(2)



(3)



(4)

Which of the following pairs of graphs best shows the distance traveled versus time and speed versus time for a car accelerating down a hill from rest?

