Equations:

$$displacement\ (d) = position\ final - position\ initial = \ x_f - x_0$$

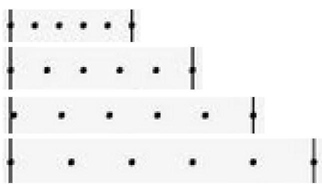
$$average\ speed = \bar{v} = \frac{distance}{time} = \frac{d}{t}$$

$$average\ velocity = \ \bar{v} = \frac{\Delta\ displacement}{\Delta\ time} = \frac{x - x_0}{t}$$

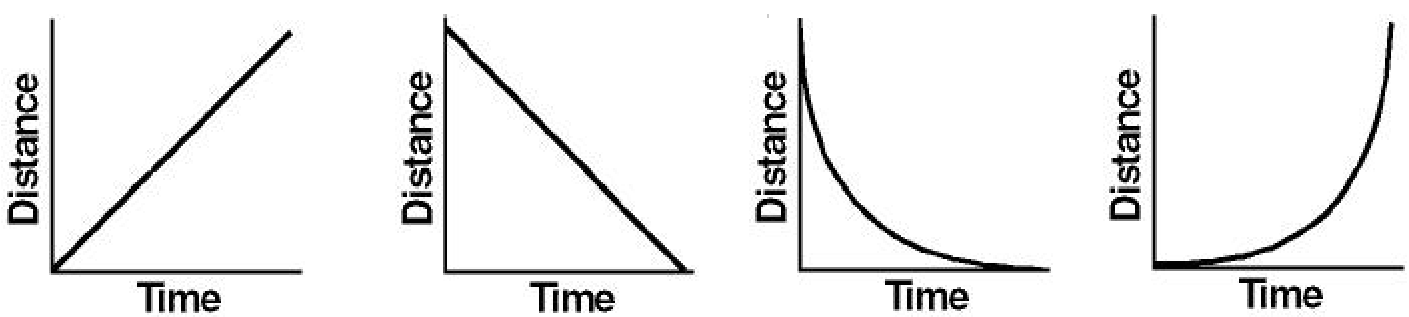
$$acceleration = \ a = \frac{\Delta\ velocity}{\Delta\ time} = \frac{v - v_0}{t}$$

1. A student did an experiment using different toy cars traveling at different speeds. Every second, the student marked where the car was at. Which of the four experiments below shows the car that is traveling the fastest constant speed?

(A)
(B)
(C)
(D)

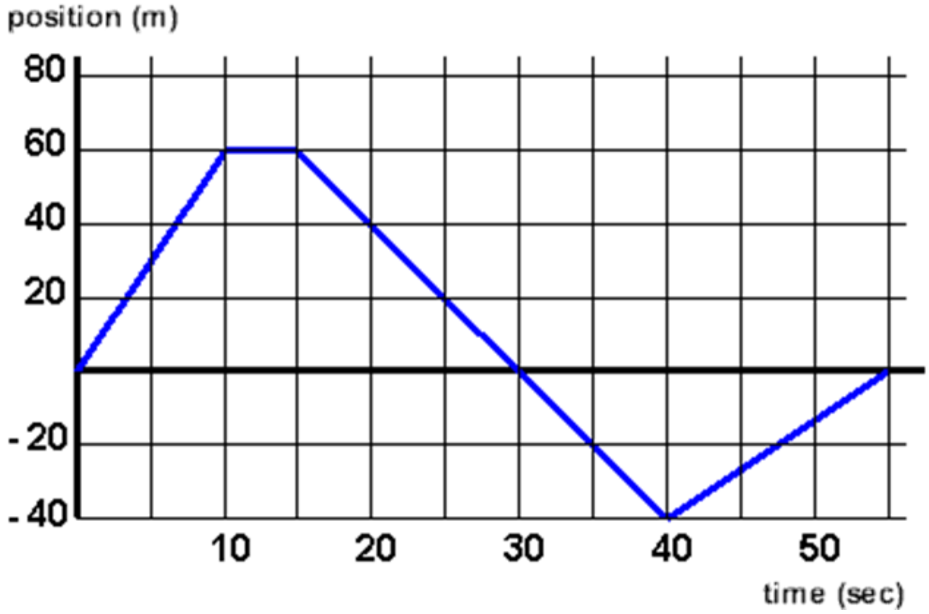


2. Which position-time (distance-time) graph below shows an object that is increasing its speed (accelerating)?



(A) (B) (C) (D)

Problems 3-6 refer to the position-time graph below showing the motion of a car.



3. According to the position-time graph above, what segments of time is the car not moving?
   (A) 0-10 seconds
   (B) 10-15 seconds
   (C) 30 seconds
   (D) 40-55 seconds

4. According to the position-time graph above, what segments of time is the car moving the fastest constant speed?
   (A) 0-10 seconds
   (B) 10-15 seconds
   (C) 15-40 seconds
   (D) 40-55 seconds

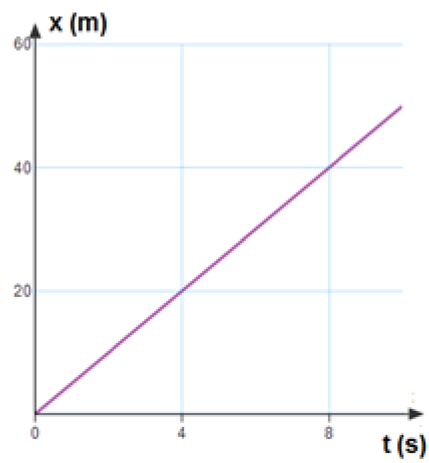
5. What was the car's average velocity from 15 seconds to 30 seconds?
   (A) + 4 m/s
   (B) – 4 m/s
   (C) + 6 m/s
   (D) – 6 m/s

6. What was the car's overall displacement for the complete 55 second trip?
   (A) 0 m
   (B) 60 m
   (C) 120 m
   (D) 200 m

7. A person on a bike accelerates uniformly from 3 m/sec to 12 m/s in a time span of 3 seconds. Calculate this person's acceleration.
   (A) 1 m/s^2
   (B) 2 m/s^2
   (C) 3 m/s^2
   (D) 4 m/s^2

8. A car is traveling on a straight road at a speed of 15 m/s and it accelerates uniformly to a speed of 21 m/s in approximately 12 seconds. What is the car's average acceleration?
   (A) 0.50 m/s^2
   (B) 0.75 m/s^2
   (C) 1.25 m/s^2
   (D) 1.75 m/s^2

The following graph represents the position as a function of time for a moving object. Use this graph to answer questions 9 and 10.



9. Which of the following is true?
   (A) The object increases its velocity
   (B) The object decreases its velocity
   (C) The object's velocity stays unchanged
   (D) The object stays at rest

10. What is the velocity of the object at 4 seconds?
   (A) 4 m/s
   (B) 5 m/s
   (C) 8 m/s
   (D) 20 m/s