In Motion Review

Part A – Multiple Choice

1. Which of the following is a measure of distance?

   A. 20 km
   B. 20 km West
   C. 20 km/h
   D. 20 km/h West

2. A car travels drives 5 km East, turns and drives 5 km North, turns and drives 5 km East, and makes one final turn and drives 5 km South to school. The total distance traveled is

   A. 0 km.
   B. 10 km East.
   C. 20 km East.
   D. 20 km.

3. A cyclist travels 7 km in 30 minutes. What is his average speed?

   A. 14 km/h
   B. 0.23 km/h
   C. 210 km/h
   D. 3.5 km/h

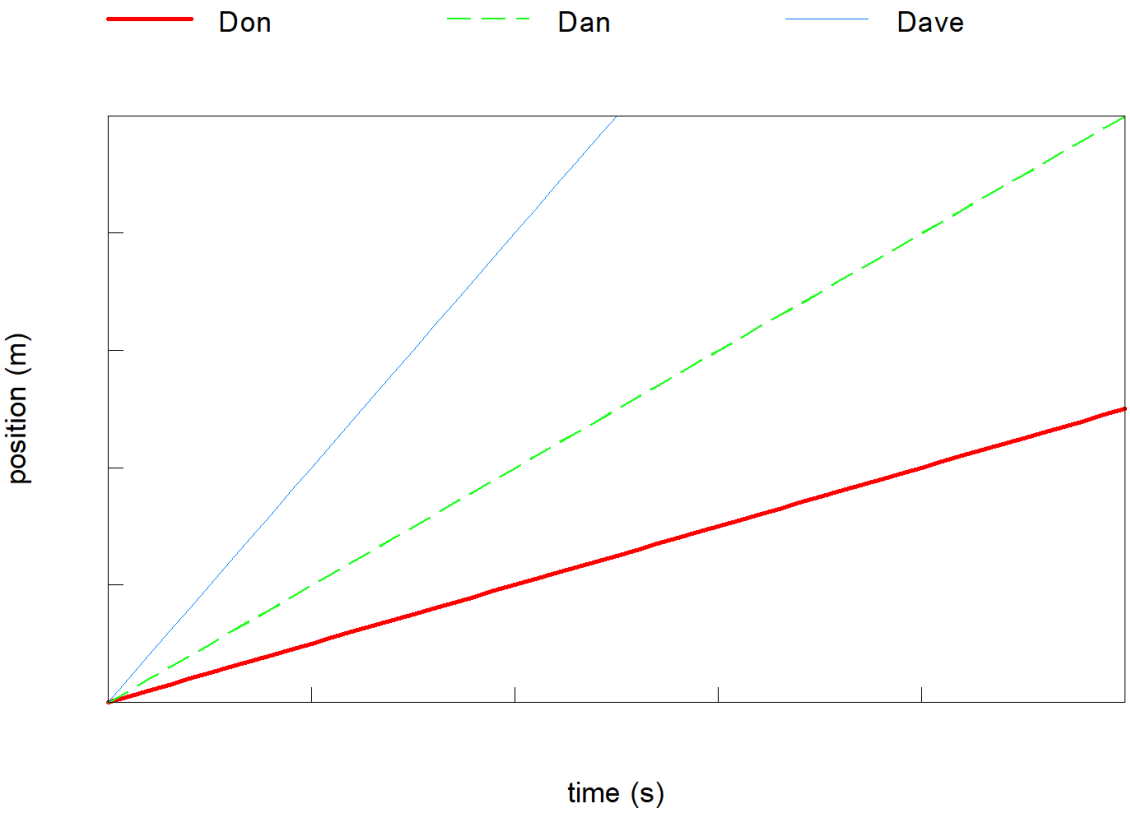
4. A speed of 80 km/h is equivalent to

   A. 288 m/s.
   B. 22.22 m/s.
   C. 22 222 m/s.
   D. 28.8 m/s.

5. Which of the following statements is correct?

   A. Speed includes the distance traveled as well as the time it takes to travel that distance.
   B. Velocity includes the distance traveled as well as the time it takes to travel that distance.
   C. Speed includes how far the ship travels per unit time as well as the direction.
   D. Velocity includes how far the ship travels per unit time as well as the direction.

6. The following position-time graph shows the distance travelled by three runners in a race.

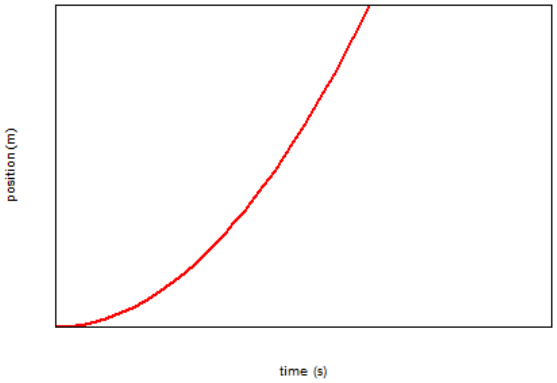


Who won the race?

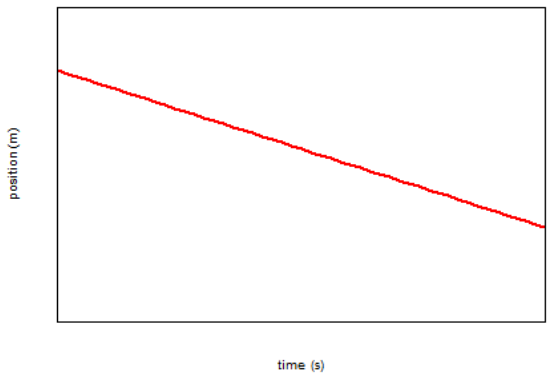
A. Dave
B. Dan
C. Don
D. It was a tie; everyone finished at the same time.

7. Which position-time graph indicates an object that is moving in a non-uniform motion?

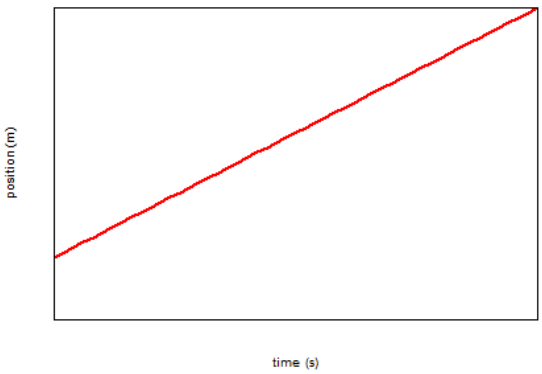
A.



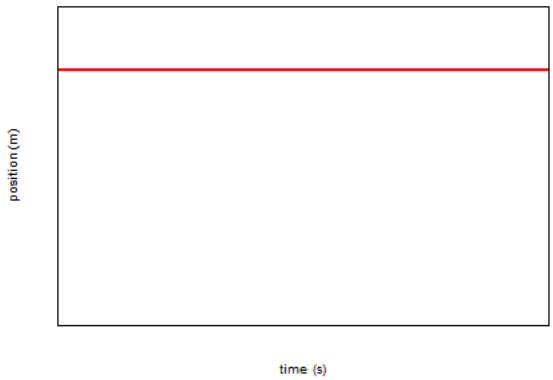
B.



C.



D.



8. A race car driver completes stages of a race with the following times:

   Stage 1 (243 km): 55 minutes
   Stage 2 (243 km): 59 minutes
   Stage 3 (324 km): 1 hour 20 minutes

   What can you conclude about the driver's motion?

   A. The driver had a positive acceleration during Stage 3.
   B. The driver had a negative acceleration during Stage 2.
   C. The driver maintained a constant speed throughout the race.
   D. None of the above.

9. A box is placed in the middle of the bed of a truck and it is not secured. As the driver of the truck accelerates forward, what happens to the of the box?

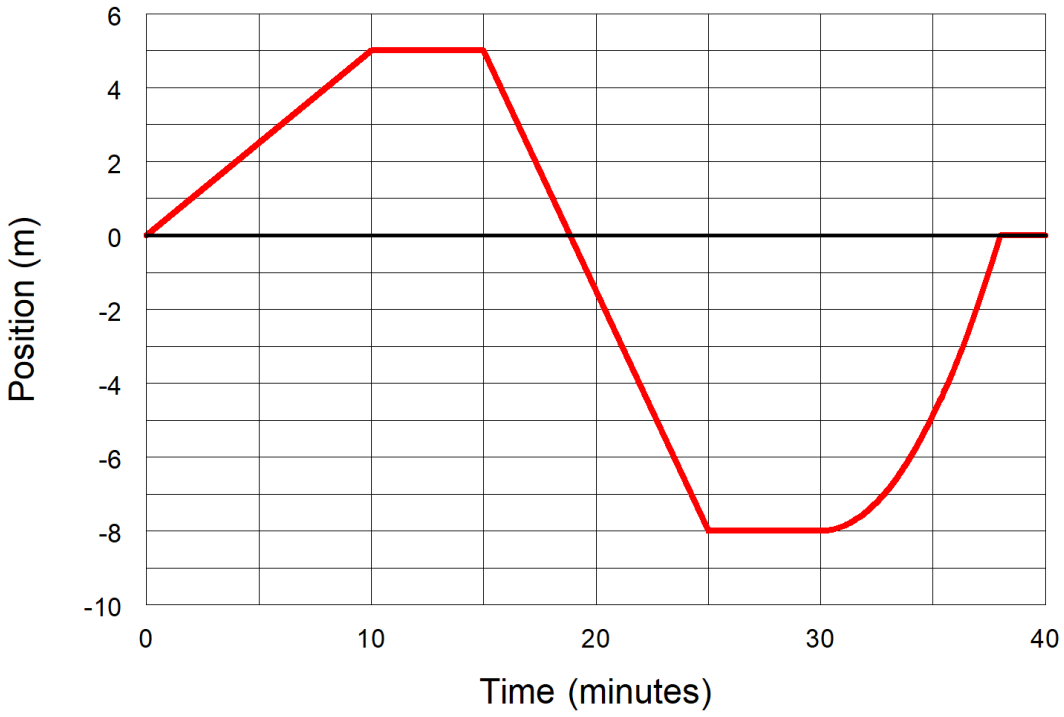
   A. The box does not move.
   B. The box moves toward the back of the truck.
   C. The box moves toward the front of the truck.

10. Which of the following conditions will **increase** the reaction time of a driver?

    A. alcohol consumption
    B. driver fatigue
    C. poor lighting on the road
    D. all of the above

Part B – Long Answer

1. The following position-time graph represents the position of a boy walking along the sidewalk. Positive position is North.



(a) Describe the motion during the following time intervals.

(i) 0 – 10 minutes _____

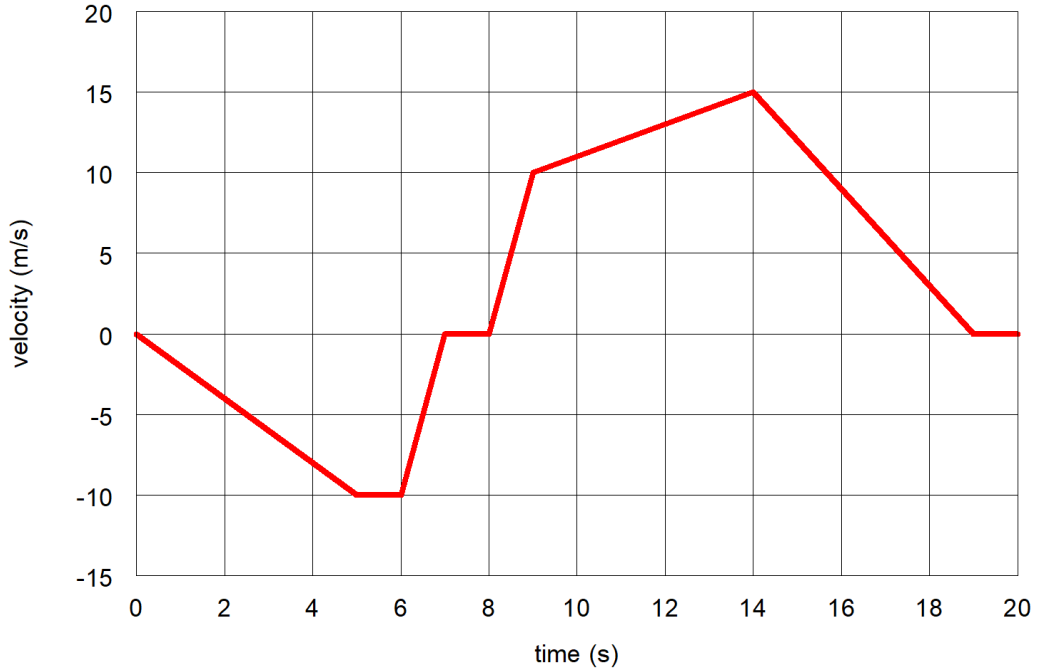
(ii) 10 – 15 minutes _____

(iii) 20 – 25 minutes _____

(iv) 30 – 35 minutes _____

(b) Calculate the boy's velocity for the first 10 minutes.

2. The following velocity-time graph represents the movement of a toy car. The positive direction is east.



(a) Describe the motion during the following time intervals:

(i) 0-5 s _____

(ii) 5-6 s _____

(iii) 6-7 s _____

(iv) 7-8 s _____

(v) 14-19 s _____

(b) Calculate the acceleration of the car during the time interval 14 – 19 s.

3. A car traveling 30 km/h brakes and slides on an icy surface (k = 0.25 m/s). Calculate the distance required to stop ignoring any reaction time.

4. A cyclist travels 12 meters in 2 seconds at a constant speed. If k = 0.2, what distance does the cyclist need to stop?

5. Describe how seatbelts help protect the passengers of a moving vehicle. Your written response should refer to Newton's first law of motion as well as momentum and impulse.