# Chapter 17 Review

Student _____

Class _____

Date _____

1. A car moves at a constant speed of 40 mph for 20 minutes. The car stops for a train for 10 minutes, then resumes a constant speed of 40 mph for another 20 minutes. Which **best** describes the motion of the car over the 50-minute trip?

   A. constant speed → constant speed → no motion

   B. constant speed → no motion → constant speed

   C. constant speed → increase of 10 mph → constant speed

   D. no acceleration → increase of 40 mph → constant speed

2. The car is described as traveling east at 30 km/hr.
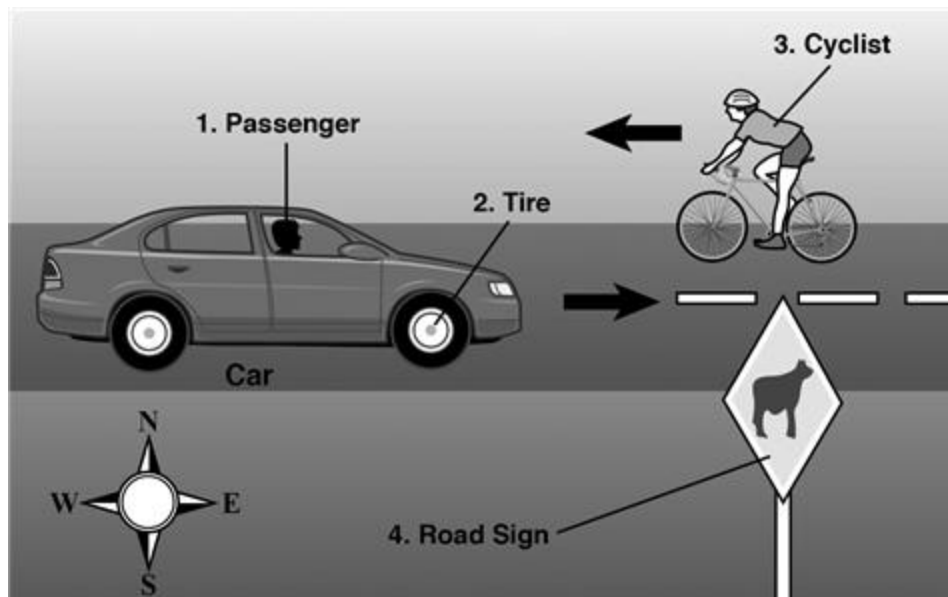
From which reference point in the diagram is the motion of the car MOST likely being described?

A. 1

B. 2

C. 3

D. 4

3. Which *best* explains how an object's motion can be changed?
   A. by changing its color

   B. by changing its flavor

   C. by applying balanced forces

   D. by applying unbalanced forces

4. Which **best** describes an object in motion?

   A. an object whose mass has changed

   B. an object whose color has changed

   C. an object that has absorbed light energy

   D. an object that has changed position over time

5. Which **best** describes the change in position of an object's location compared to a reference point?

   A. acceleration

   B. motion

   C. speed

   D. vector

6. If Jeff is walking 2 miles per hour (mph), how far can he travel in 1 hour?

   A. 2 miles

   B. 3 miles

   C. 4 miles

   D. 5 miles

7. A car is traveling south on the highway at 55 mph. It passes several road signs and a bus that is heading north on the same highway. Which reference point is *best* used for a reference point to show the car is moving?

A. a tire on the bus

B. the driver of the car

C. the driver of the bus

D. a road sign beside the highway

8. A man was pedaling a bicycle at an average speed of 5 miles per hour. After 3 hours, how far had the man traveled? (distance = rate * time)

A. 2 miles

B. 5 miles

C. 8 miles

D. 15 miles

9. David is new to Holly Middle School and was given a map to find his classes. He starts from the school office and walks south 50 meters to his science class. Which *best* represents David's reference point?

A. map

B. 50 meters

C. school office

D. science class

10. A student drives 50 miles north from the starting line of a race, then drives 60 miles going south. Which **best** describes the student's distance from the starting line?

    A. 10 miles south

    B. 10 miles north

    C. 110 miles south

    D. 110 miles north

11. Alex is writing down notes as he watches his friend Carla in a bicycle race. He makes the following notes.

> 1. She is traveling northeast.
> 2. She is traveling at 13 miles per hour.
> 3. Her bicycle has nine gears.
> 4. She can go downhill faster than uphill.
> 5. She has just passed the school.

Which notes show that Carla's bicycle is in motion?

    A. 1, 2, and 5

    B. 1, 2, and 3

    C. 2, 3, and 5

    D. 2, 3, and 4

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12. A baseball player swings his bat and hits a ball along the ground. After some time, the ball rolls to a stop on the level playing field.

What MOST likely causes the ball to stop moving?

A. a frictional force

B. the size of the bat

C. the mass of the ball

13. When the space shuttle returned to Earth, a force opposed its motion. What was the source of the opposing force?

A. friction from the atmosphere

B. the velocity of the shuttle

C. the mass of the shuttle

D. gravity from Earth

14. What is the amount of force required to accelerate a 20 kg object to 5 m/s²? F = m * a.

   A. 0.25 N

   B. 4 N

   C. 15 N

   D. 100 N

15. According to Sir Isaac Newton, what will happen to an object that is already in motion when acted upon by balanced forces?

   A. It will stay in motion.

   C. It will immediately stop.

   D. It will accelerate indefinitely.

16. In order for a rope to anchor a boat in place, the rope must exert a force

   A. equal to the force exerted by the boat on the rope.

   B. equal to the force exerted by the water current in the same direction.

   C. greater than the force exerted by the water current in the opposite direction.

   D. greater than the force exerted by the water current in the same direction.

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17. Which **best** describes two equal forces that are acting in opposite directions on an object?

    A. friction forces
    B. balanced forces
    C. centripetal forces
    D. gravitational forces

18. Mac and Janelle found a plate of cookies waiting on the center of the square kitchen table when they got home. Each of them reached for the plate from opposite side of the table. Both of them grabbed the plate at the same time.
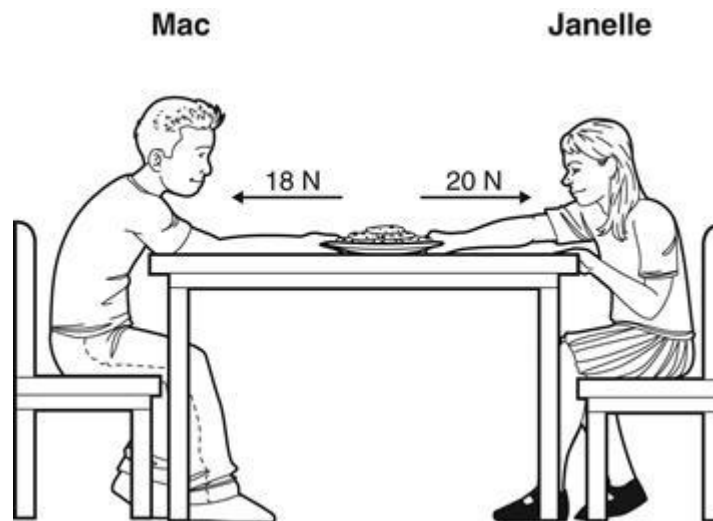
If Mac pulled with a force of 18 newtons (N) and Janelle pulled with a force of 20 newtons (N), which correctly describes the forces applied to the plate of cookies?

    A. The forces are equal and opposite in direction.
    B. The forces applied to the plate of cookies are balanced.
    C. The net force applied to the plate of cookies is 2 newtons (N).
    D. The net force applied to the plate of cookies is 38 newtons (N).

19. Which mass is undergoing the greatest amount of acceleration?

  A. 1 kg subjected to a force of 1 N

  B. 1 kg subjected to a force of 100 N

  C. 100 kg subjected to a force of 1 N

 **D.** 100 kg subjected to a force of 100 N

20. The rate of acceleration of an object is determined by the mass of the object and

  A. the initial velocity of the object.

  B. the forces acting on the object.

  C. the direction of movement of the object.

  D. the change in kinetic energy of the object.

21. Marisa and Dakota were investigating air friction. Marisa dropped a ball, a pen, a sweatshirt, and a flat sheet of paper from the same height. Dakota recorded the amount of time it took each object to reach the ground. Which object MOST likely took the longest amount of time to reach the ground?

  A. the pen

  B. the ball

  C. the sweatshirt

  D. the sheet of paper

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22. An object is being subjected to four forces as shown.
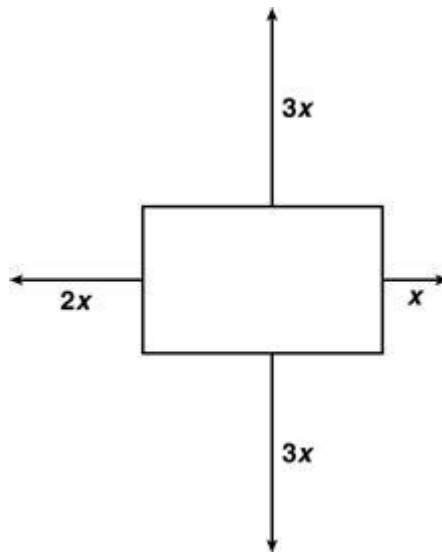
What is the net force acting on the object? (Notice north and south forces are balanced)

A. x

B. $2x$

C. $3x$

D. $9x$

23. A student draws a car with two forces.
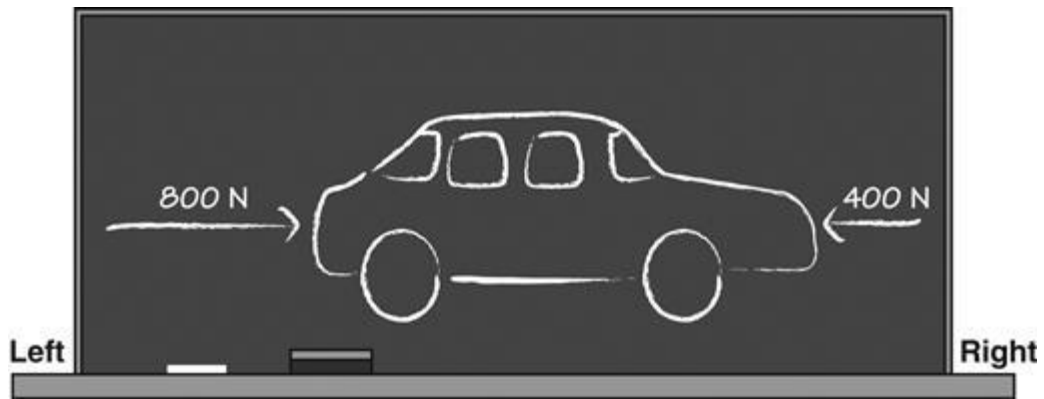
Which statement would BEST describe the diagram?

A. The forces of 800 N and 400 N should be multiplied to get the net force being applied to the car.

B. The applied forces of 800 N and 400 N will result in the car moving to the right.

C. The forces acting on the car are equal and the car will remain motionless.

24. A 20 N object is placed on a surface and starts to slide. What is the MOST likely reason the object begins to move?

A. Gravity exerts a balanced force on the object.

B. An unbalanced force causes acceleration.

C. Friction is applied to the object.

D. The forces acting on the object are in equilibrium.

25. Max pushed and released a toy dump truck on a flat sidewalk. The truck traveled for a long distance and stopped when it hit a wall. Which BEST explains why the truck traveled the long distance to the wall?

A. The truck had inertia due to its mass.

B. Gravity pulled the truck to the wall.

C. Magnetism pulled the truck to the wall.

26. Students are strapped into the car of a roller coaster ride. The ride makes a sudden stop. How does inertia affect the students in the car?

A. The students' bodies will move backwards.

B. The students' bodies will keep moving forward.

C. The students' bodies will stop when the roller coaster car stops.

D. The students' bodies will stop moving when the roller coaster car stops then continue moving in a forward motion.

27. The diagram shows two forces acting on a ball at the same time.

1 N

2 N
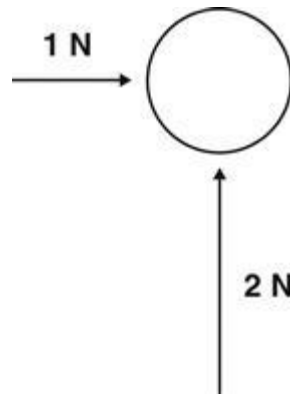
Which arrow represents the MOST likely direction the ball will move?

A.

B.

C.

D.

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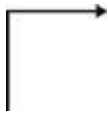
28. The illustration below shows forces acting on a box.

What is the net force on the box? (Ignore the 5N)

A. 5N to the left

B. 8N to the right

C. 13N to the right

D. zero net force

29. Which **best** demonstrates balanced forces on an object?

A. A tennis ball rolls down a hill.

B. A bowling ball sits motionless.

C. A windmill spins during a light breeze.

D. A car slides across the ice when brakes are applied.

30. A student pushes a shopping cart filled with groceries. The cart has a mass of 12 kilograms (kg). The student pushes the cart with a force of 15 newtons (N). Assuming the ground is frictionless, how fast will the cart accelerate until the student stops applying the force?

(a = F/m) You may use the calculator on your chromebook.

A. 0.625 m/s^2

B. 0.8 m/s^2

C. 1.25 m/s^2

D. 2.5 m/s^2

31. A person stands motionless on Earth's surface on a rainy day with no wind. To that person, which direction will the rain appear to fall?

A. vertically

B. diagonally

C. horizontally

D. circularly

32. Which of these is an example of Newton's first law of motion?

   A. A baseball hit with a baseball bat travels faster than a bowling ball hit with the same force.

   B. A basketball bounces on the ground with the same force that the ground pushes up on the ball.

   C. A person jumps to a dock from a boat, and the boat moves away from the dock.

   D. A person standing on a bus moves backward when the bus suddenly moves forward.

33. Newton's first law of motion states that an object at rest will stay at rest unless acted upon by an outside force. Which activity is an example of this law?

   A. A football is kicked off a tee.

   B. A baseball player slides into second base.

   C. A floating stick is carried over a waterfall.

   D. A bicycle travels faster as it goes downhill.

34. Two forces of 400 newtons (N) each are acting on a box.
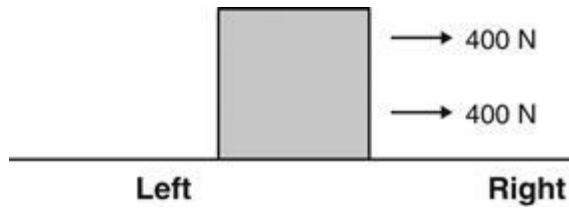
Which statement BEST describes the forces at work?

A. The net force applied is zero.

B. The net force applied is unbalanced.

C. A contact force moves the object to the left.

35. A 60-kg man and a 25-kg boy, both on roller skates, push off using the same force. Which of these describes the motion of the two people?

A. The man moves farther and faster than the boy.

B. The boy moves farther and faster than the man.

C. The man moves farther but the same speed as the boy.

D. The boy moves faster but the same distance as the man.

36. If a leaf and a dime are dropped from the same height, what force will cause the leaf to fall more slowly?

    A. frictional force

    B. centripetal force

    C. gravitational force

37. A swimmer swims across a pool, and at the end the pool she turns around and pushes off the wall with her feet. Which option describes a pair of action-reaction forces during the push?

    A. the force of her feet on the wall and the force of the wall on her feet

    B. the force of gravity on her body and the force of her feet on the wall

    C. the force of gravity on her body and the force of the wall on her feet

38. A car is traveling on a highway at a constant velocity. Which statement BEST describes the forces acting on the car?

    A. The forces acting on the car are balanced.

    B. The forces acting on the car are continuing to increase.

    C. The forces acting on the car are unbalanced.

39. A student walking quickly while carrying an orange on his lunch tray stops suddenly. The orange will MOST likely roll off the tray due to ___.

   A. inertia of the orange.

   B. centripetal force of the orange.

   C. the friction acting on the orange.

   D. the balanced forces acting on the orange.

40. In a tug-of-war game, balanced forces are BEST represented when both teams cause the flag to

   A. stay in the middle.

   B. fall to the ground.

   C. move slowly in one direction.

   D. be pulled quickly in one direction.

41. A brick is resting on a level, smooth surface. When a student applies a horizontal force of 5 N to the brick, the force of friction on the brick is also 5 N. Which statement BEST describes the effect of these two forces on the brick?

   A. The net force on the brick is 0 N, and the brick remains at rest.

   B. The net force on the brick is 10 N, and the brick begins to move.

   C. The net force on the brick is 10 N, and the brick remains at rest.

42. The drawing shows a cup on a table.

Which statement BEST describes the relationship between the cup and the table?

A. The cup is accelerating faster than the table.

B. The cup is pushing on the table and the table is pushing on the cup.

C. The cup is doing work on the table.

D. The forces on the cup are unbalanced.

43. A teacher was discussing with the class that a bowling ball has more inertia than a basketball. Which physical property is MOST likely being compared?

A. area

B. mass

C. buoyancy

44. A student conducted an experiment with a toy cart by varying the force applied toward the right and observing the result. The force applied to the left was constant at 50 N. For a force of 50 N to the right, the student would observe

   A. a rapid motion to the right.
   B. a rapid motion to the left.
   C. a slight motion to the right.
   D. no motion in either direction.

45. The diagram shows three forces being applied to a crate on a floor.
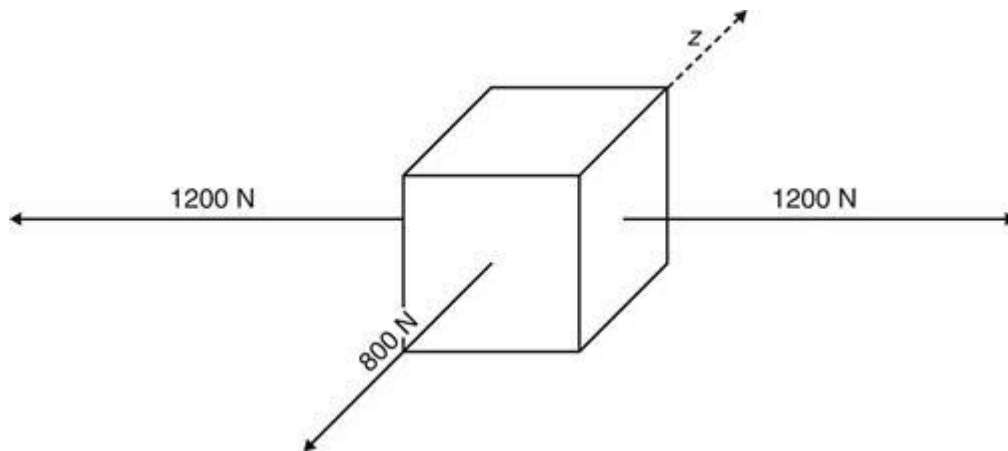
   If the crate is to remain stationary, what amount of force must be applied for *z*?

   A. 800 N
   B. 1200 N
   C. 2000 N
   D. 2400 N

46. To move a refrigerator, forces are applied as shown.

135 N

175 N

40 N

Left   Right
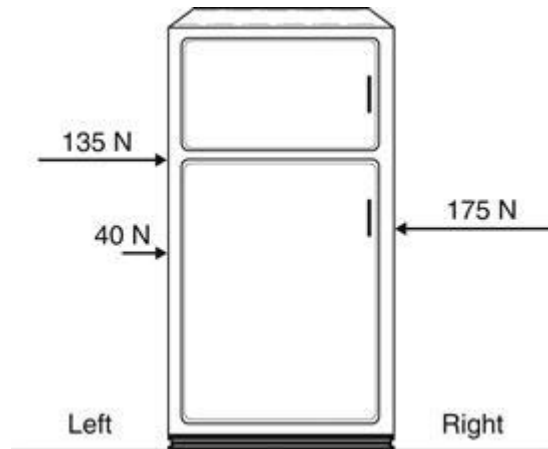
Which of these statements BEST describes what will happen if the forces are applied at exactly the same time?

A. The refrigerator will move left, because of the greatest force on the right.

B. The refrigerator will move right, because the force is over a greater surface area.

C. The refrigerator will remain in place, because the forces are not enough to move a refrigerator.

D. The refrigerator will remain in the same place, because the net force is zero.

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47. During a collision, a seat belt slows the speed of a crash dummy. What is the direction of the net force exerted by the seat belt compared to the direction of the crash dummy's motion?

   A. in the same direction

   B. in a downward direction

   C. in the opposite direction

48. A toy car starts at the top of a ramp, rolls down and slows to a stop.
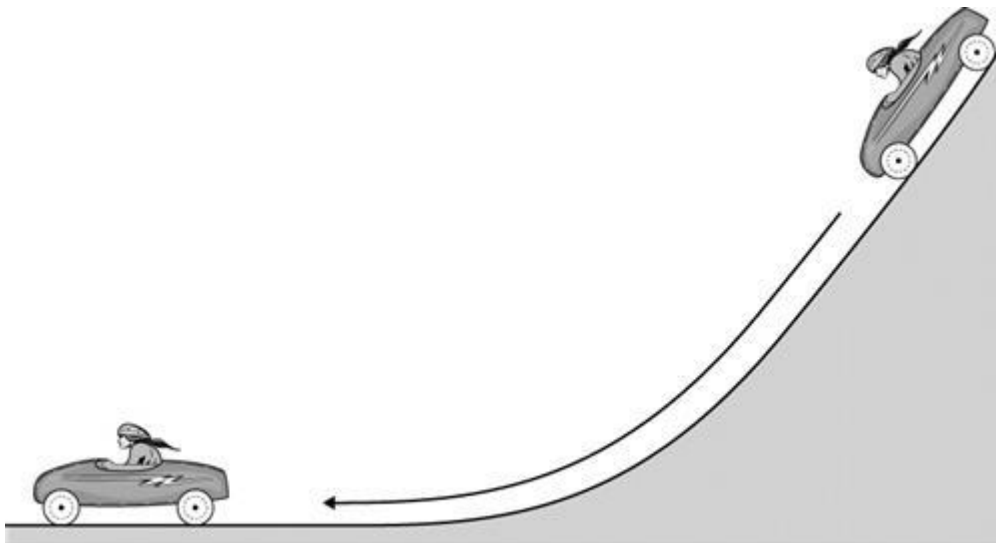
   Which acts MOST to bring the car to a stop?

   A. friction

   B. magnetism

   C. wind speed

   D. electrical force

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49. The arrows indicate the direction a 40-mile-per-hour wind is blowing. Which shows the wind direction that would slow a moving car the MOST?

A.

B.

C.

D.
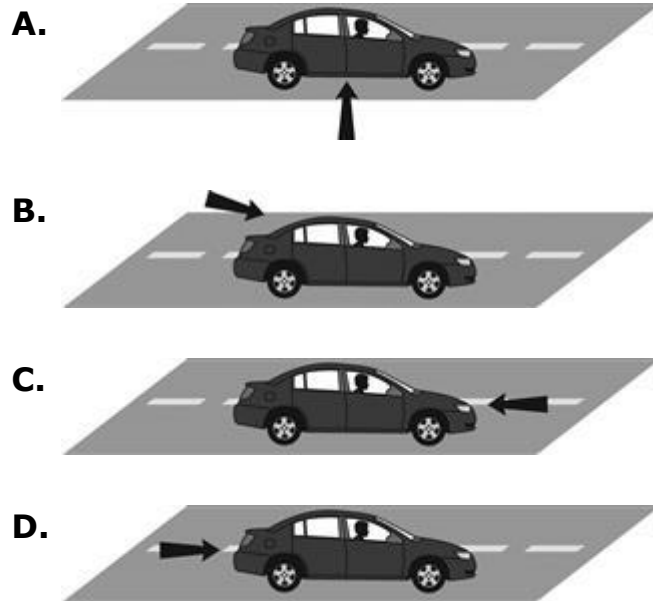
50. Which *best* describes the relationship between forces and motion?

A. Forces change motion.

B. Forces cause no change in motion.

C. Motion affects gravity, which changes forces.

51. A helicopter ambulance flew from one hospital to another in a straight line. The pilot had to change speed several times due to the presence of other aircraft.

Distance Traveled by Helicopter
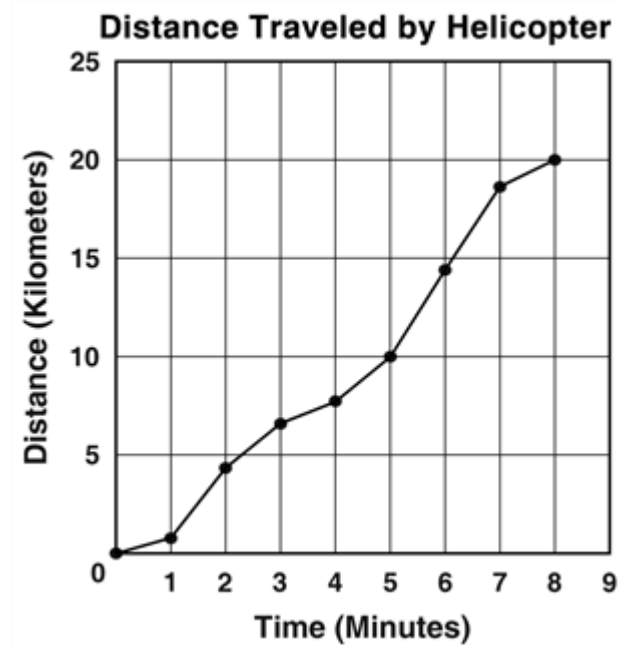
What was the average speed of the helicopter during the trip? (r = D/t)

A. 2.0 km/min

B. 2.5 km/min

C. 4.0 km/min

D. 7.5 km/min

52. Which **_best_** describes how the average speed is different from constant speed?

    A. Average speed is the total distance traveled divided by total time; constant speed never changes.

    B. Average speed never changes; constant speed is the total distance traveled divided by total time.

    C. Average speed is total time divided by distance traveled; constant speed never changes.

    D. Average speed never changes; constant speed is total time divided by total distance.

53. Tisa and Lily ran a race in gym class. Lily was off balance so she did not start until 2 seconds had passed.

Footrace Results
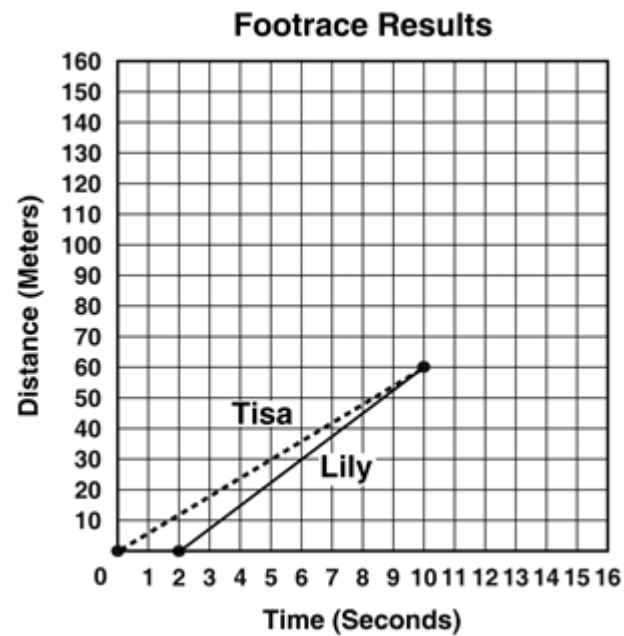
What were the average speeds of the two runners during the periods in which they were actually running? (Note: Lily did not start running until time = 2 s.)(r = D/t)

A. Tisa: 6.0 m/s; Lily: 6.0 m/s

B. Tisa: 6.0 m/s; Lily: 7.5 m/s

C. Tisa: 7.5 m/s; Lily: 6.0 m/s

D. Tisa: 7.5 m/s; Lily: 7.5 m/s

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54. The graph below shows the position of an object over time. At what time or times is the distance 2 meters?
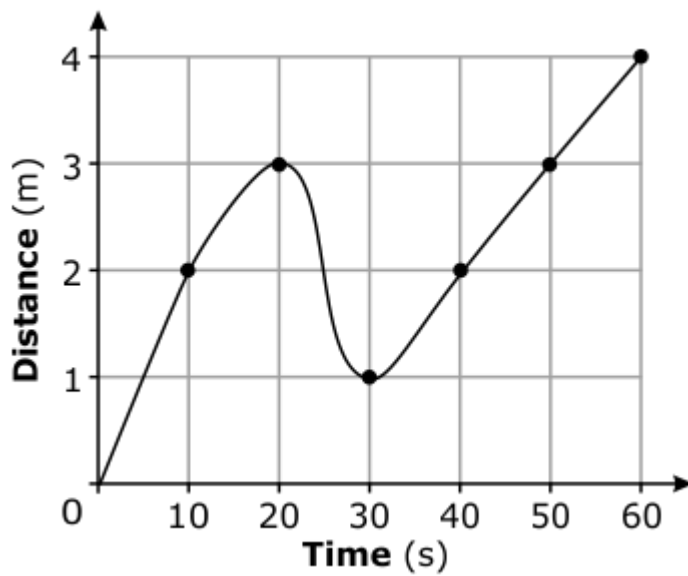
A. 0s and 30s

B. 10s and 40s

C. 20s and 60s

D. 30s and 60s

55. This graph shows the distance traveled by a remote control toy car over time.

Distance Traveled by Toy Car
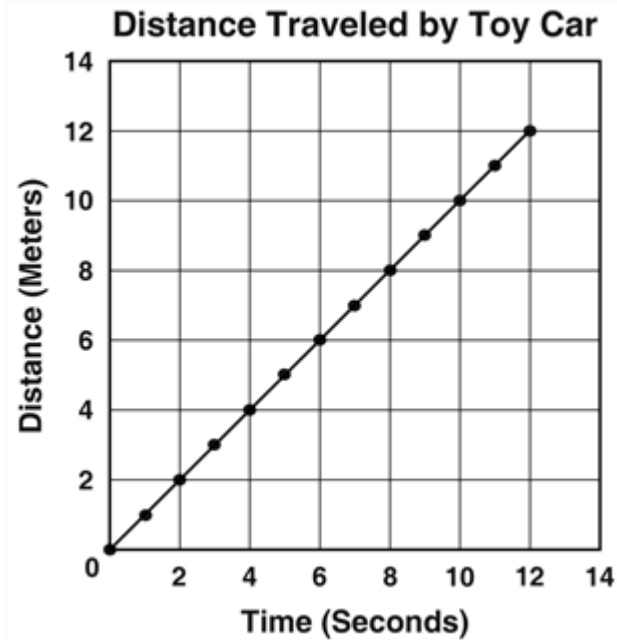
If the car continues moving at the same rate, how far will it travel in 2 minutes? (Remember to convert time to seconds)

A. 10 m

B. 60 m

C. 120 m

D. 200 m

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56. This is a graph of the motion of a small boat traveling at a constant speed. What is the speed of the small boat?

Total Distance Traveled
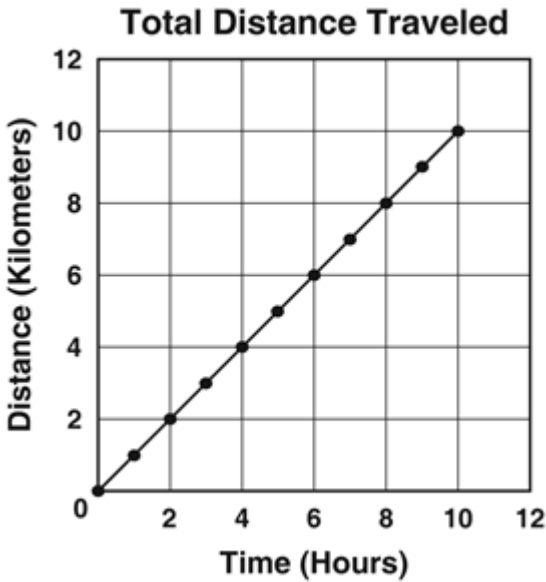
A. .1 km

B. .5 km

C. 1 km

D. 2 km

57. The graph below shows the distance a person ran over a 4-hour period. What **best** describes the speed of the runner?
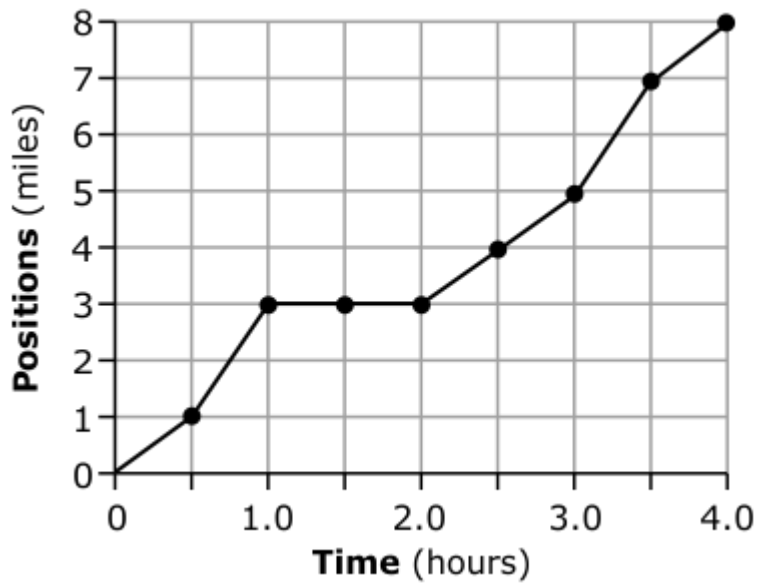
A. The runner did not run at a constant speed.

B. The runner run at a constant speed.

C. The runner run at a constant speed of 2 mph.

58. The graph below represents a car traveling approximately 14 km in about 16 hours. What **best** describes what occured during the time between 10 hours and 12 hours?
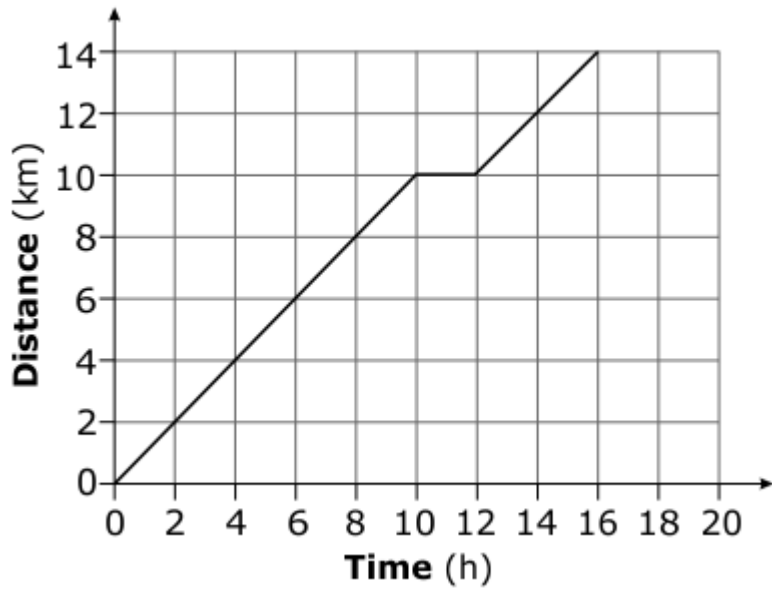
A. The car was stopped.

B. The car was speeding up.

C. The car was slowing down.

D. The car was changing directions.

59. The graph below shows the distance a bus traveled over seven hours. During which time interval was the bus traveling the fastest?

Distance Traveled by Bus
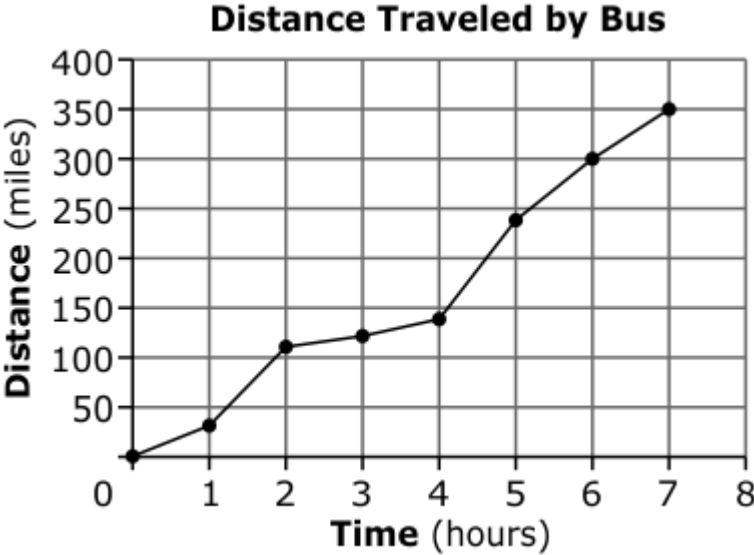
A. between hours 3 and 4

B. between hours 4 and 5

C. between hours 5 and 6

D. between hours 6 and 7

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60. The graph below shows a horse's change in position over a period of time. What best describes the horse's actions between points U and V?
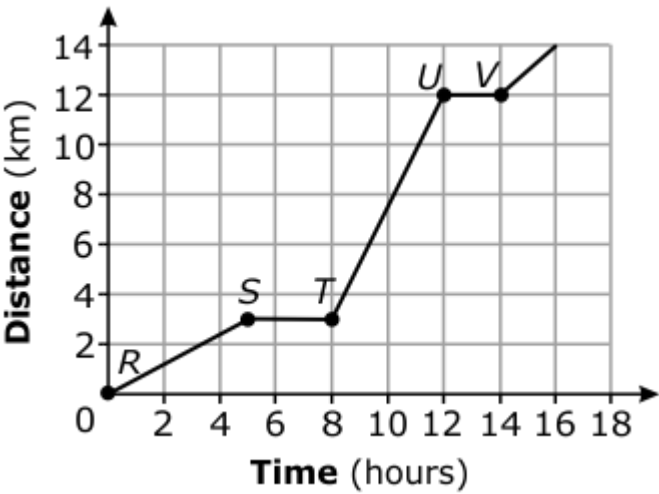
A. accelerating

B. resting

C. running

D. walking

61. The graph below shows the position versus time of a roller coaster. What best describes the roller coaster between 2 and 3 seconds.

Position Versus Time
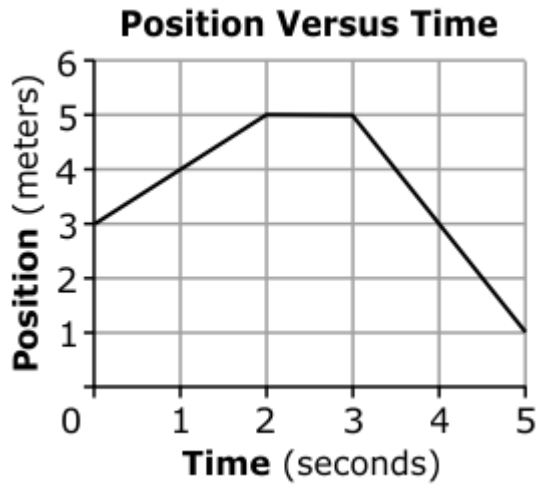
A. The roller coaster is nearing a turn.

B. The roller coaster is moving up a hill.

C. The roller coaster is moving down a hill.

D. The roller coaster is sitting on top of a hill.

62. Two toy cars are traveling on a track.

Speed of Toy Cars
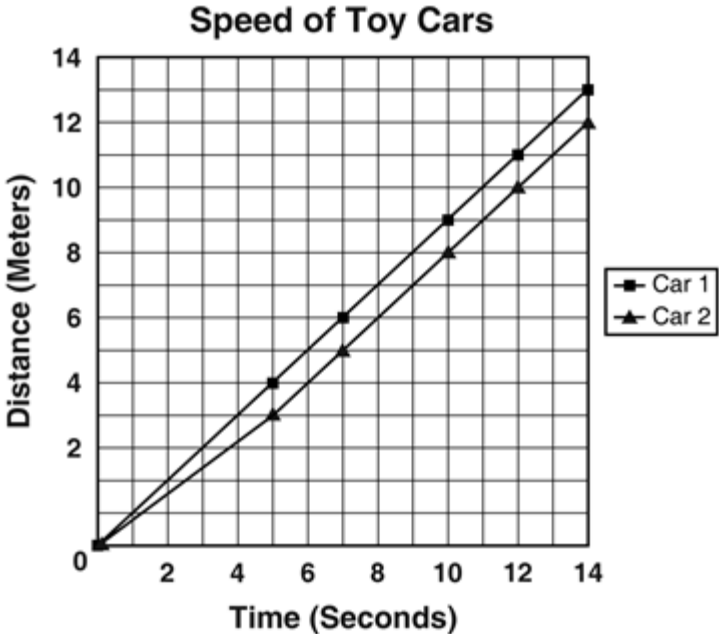
Thirteen minutes after they start, how does the average speeds of the cars compare?

A. Both cars are traveling at the same speed.

B. Both cars have stopped moving on the track.

C. Car 1's average speed is greater.

D. Car 2's average speed is greater.

63. The graph below shows the motion of a bus. How far will the bus have traveled after 9 hours based on the graph below?

Distance Traveled by Bus
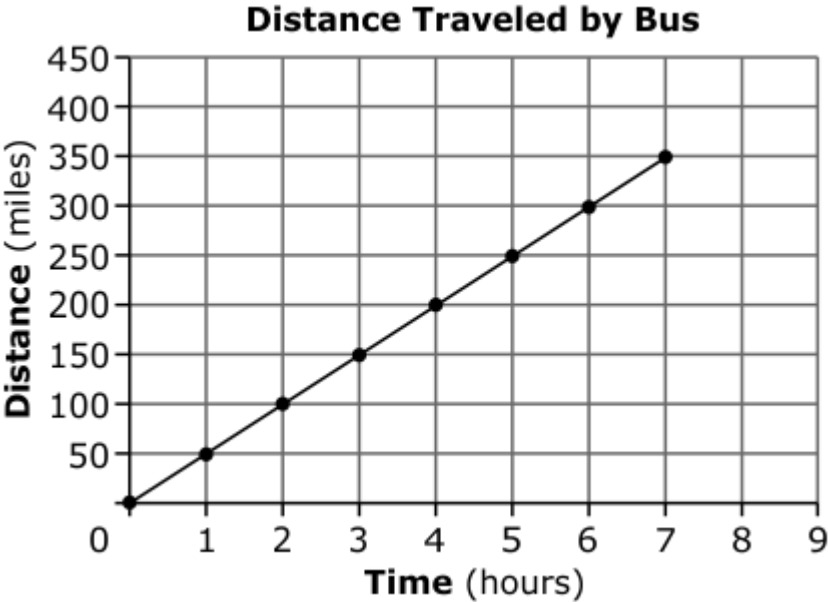
A. 450 miles

B. 500 miles

C. 540 miles

D. 600 miles

64. A toy robot moved from a starting point, traveling in a straight line at different speeds and then turning around and returning to the starting point at different speeds.
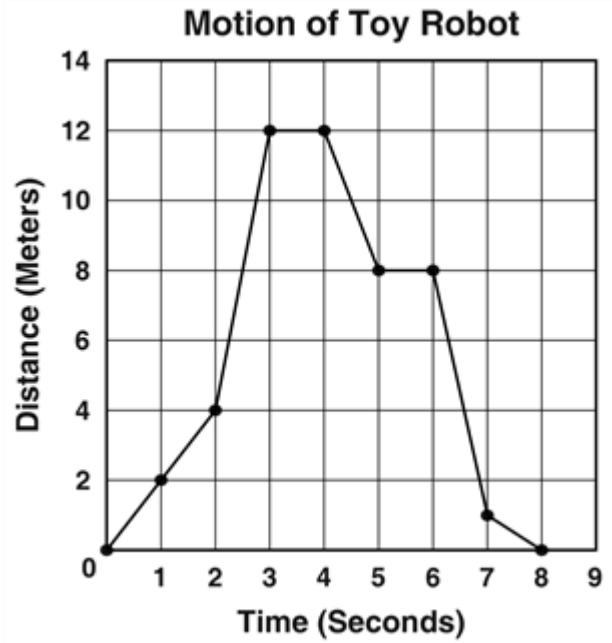
Motion of Toy Robot

What is the total distance that the toy robot traveled?

A. 12 m

B. 24 m

C. 48 m

D. 96 m

65. The motion of a toy car is shown in the graph below.

Motion of a Toy Car
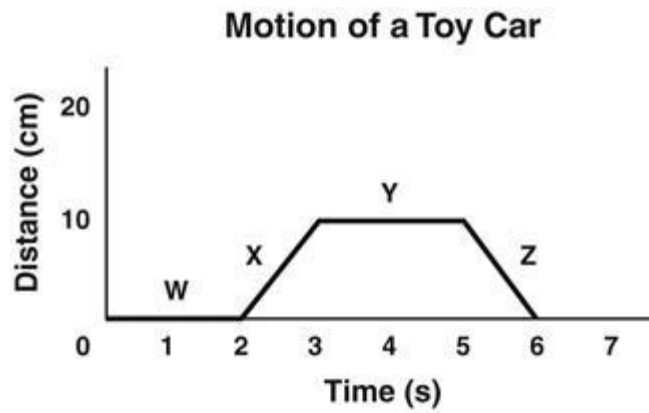
In which section of the graph is the car moving away from its starting point?

A. W

B. X

C. Y

D. Z

66. The graph below shows the movement of Emily's fastball. How far will the ball travel in 5 seconds?
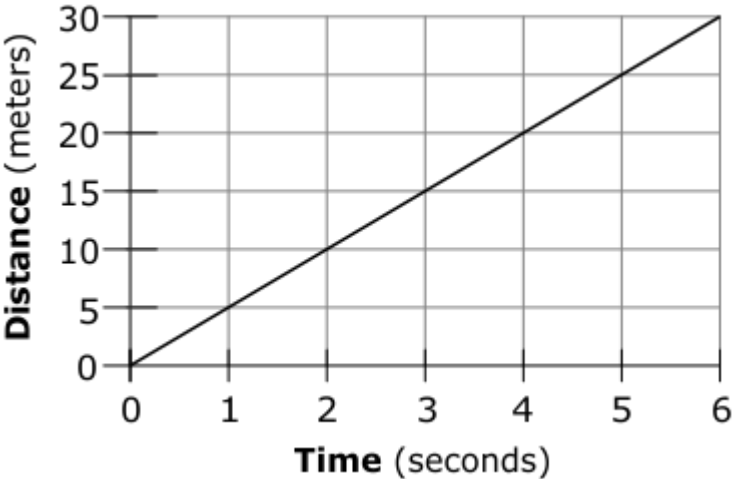
A. 5 meters

B. 15 meters

C. 25 meters

D. 35 meters

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67. Terrell decided to see how fast he could coast on his skateboard between his house and his friend Jason's house. Jason's house was 150 meters down the street from his house. Terrell and Jason marked the street with chalk in equal sections. Jason recorded the time for Terrell to complete each section of the trip. Their results are shown in the graph below.

Terrell's Skateboard Experiment
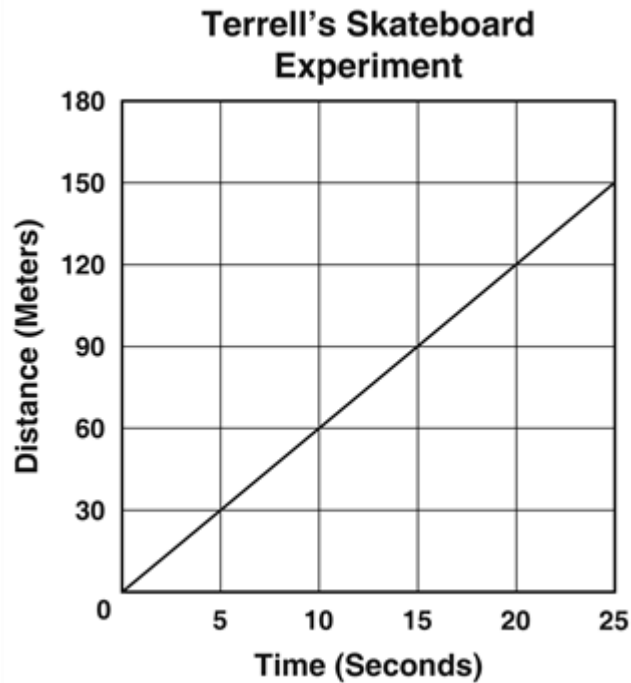
Based on the graph, what was Terrell's speed during his experiment? r = D/t

A. 5 m/s

B. 6 m/s

C. 30 m/s

D. 150 m/s

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68. Two swimmers competed in a race. The graph shows how the position of both swimmers changed over time during the race.

Motion of Swimmers in Race
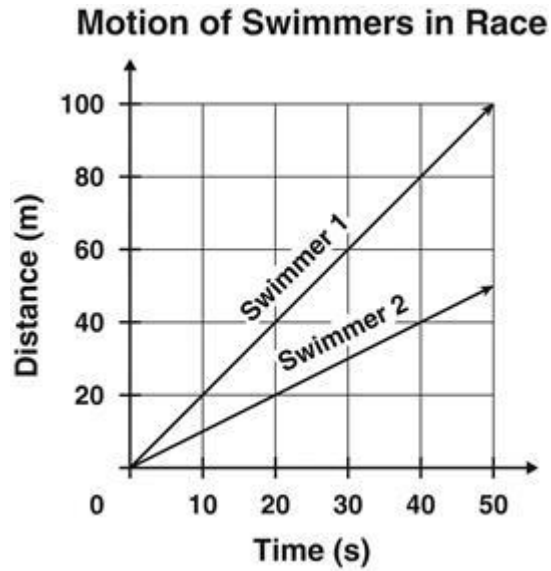
At what rate of speed did Swimmer 1 travel throughout the race? r = D/t

A. 0.5 m/s

B. 1.0 m/s

C. 2.0 m/s

D. 4.0 m/s

69. The graph below shows a car moving at a constant speed. What best describes the graph below?
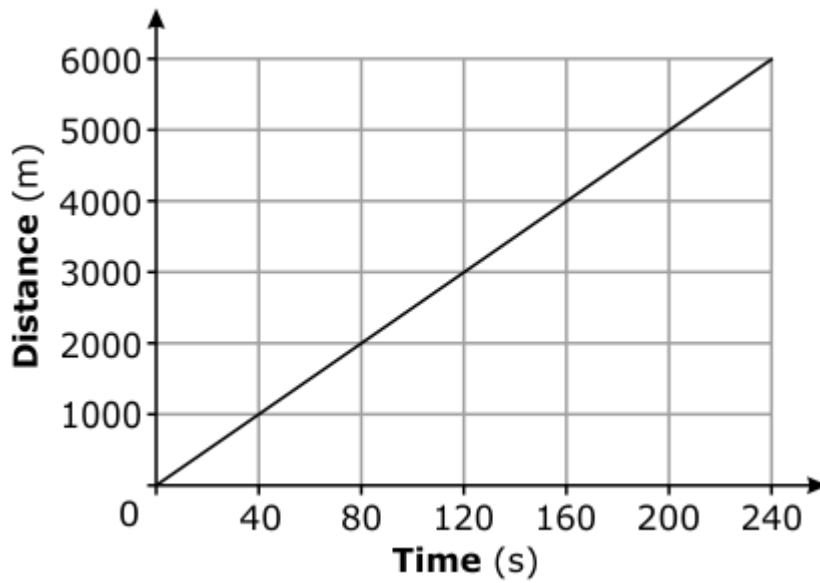
A. the distance the car traveled

B. the time it took the car to travel the distance

C. the distance the car traveled, the amount of air resistance, and friction

D. the distance the car traveled, and the time it took to travel that distance

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70. The graph shows the motion of a student walking at different speeds.

Student's Motion
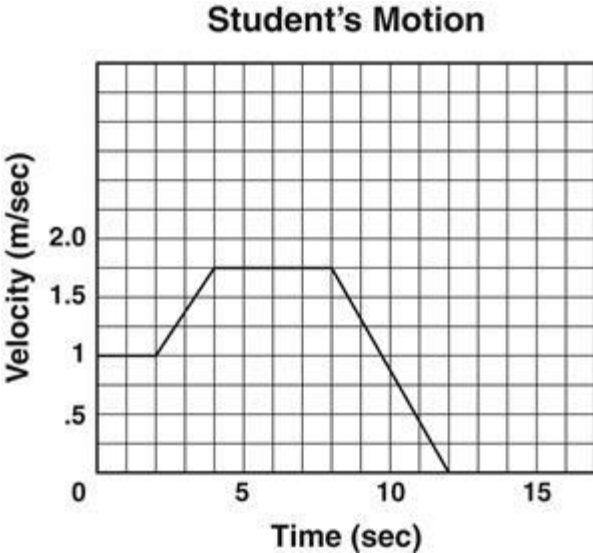
During which time interval does the student walk with a negative acceleration?

A. 0–2 seconds

B. 2–4 seconds

C. 4–8 seconds

D. 8–12 seconds

71. The graph below represents a distance-time graph of a 50-meter race. How long does it take for Ashok to run 25 meters?

Distance-Time Graph of Foot Race
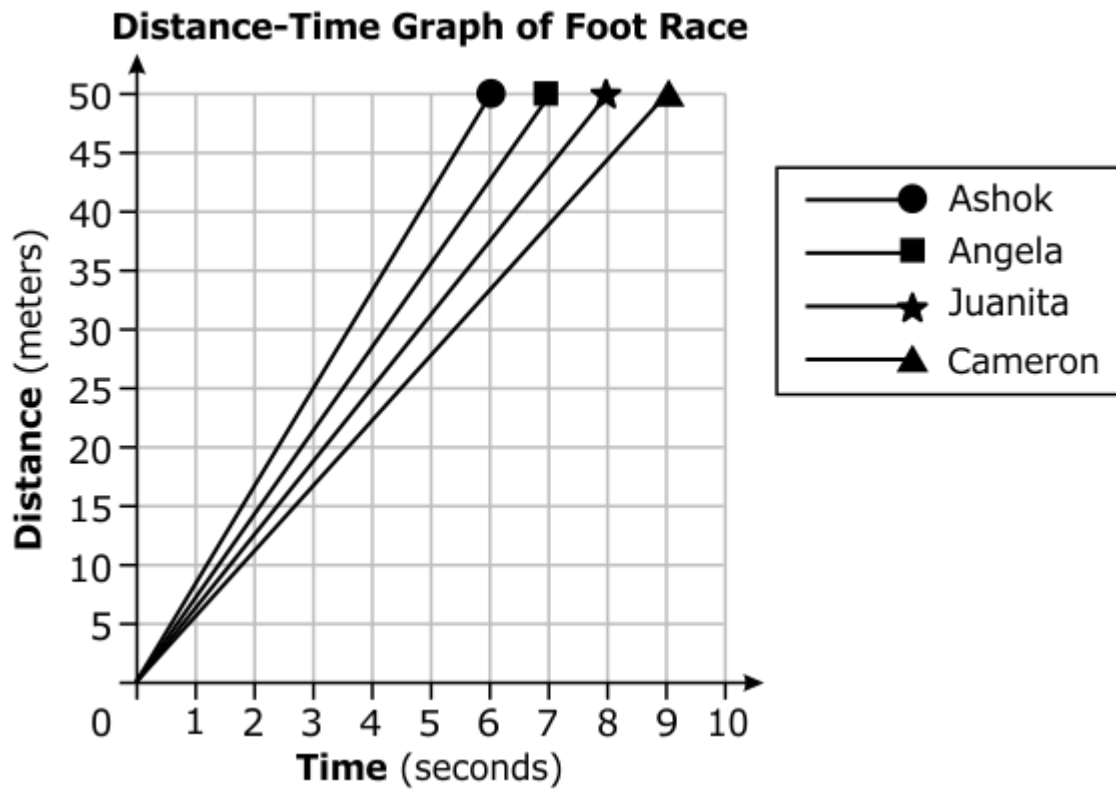
A. 1 second

B. 2 seconds

C. 3 seconds

D. 4 seconds

**72.** The graph below represents a biker, runner, and a walker, and their respective distances traveled over time.
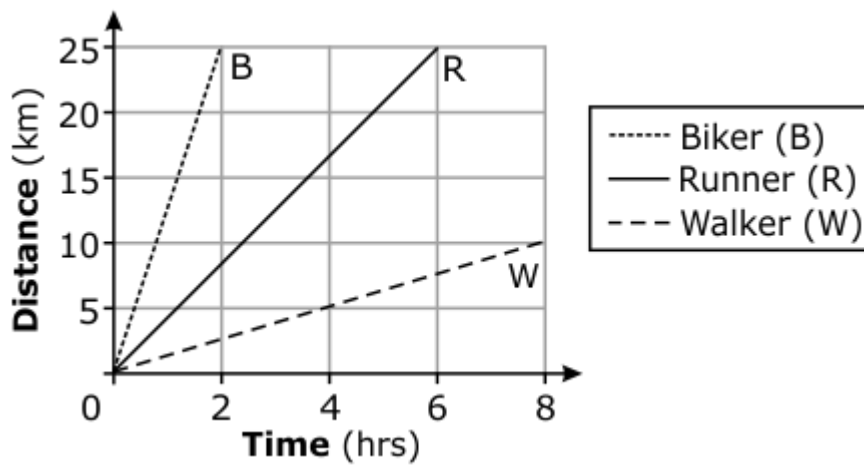
A. The biker moved at a slower speed than either the runner or the walker.

B. The biker moved at a faster speed than either the runner or the walker.

C. The walker moved twice as slow as the runner.

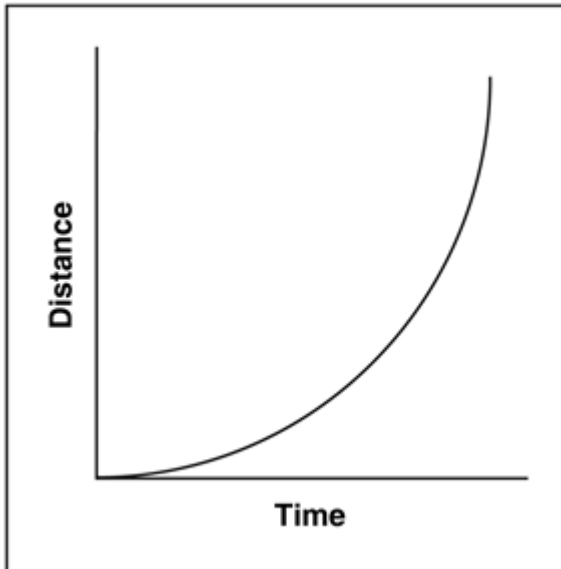**D.** The runner moved twice as slow as the biker.

73. Which graph could represent a car moving at a constant speed in a forward direction?

A.

B.
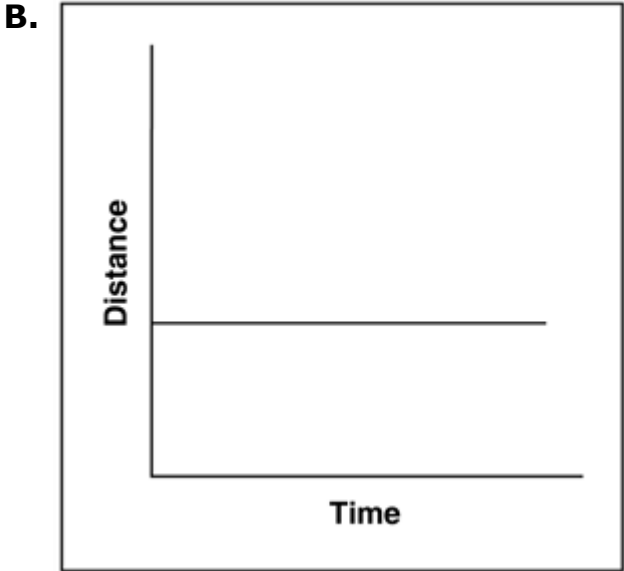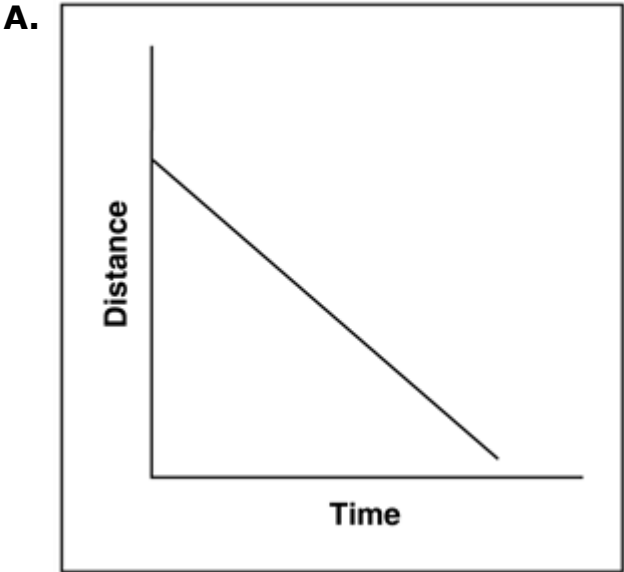
C.
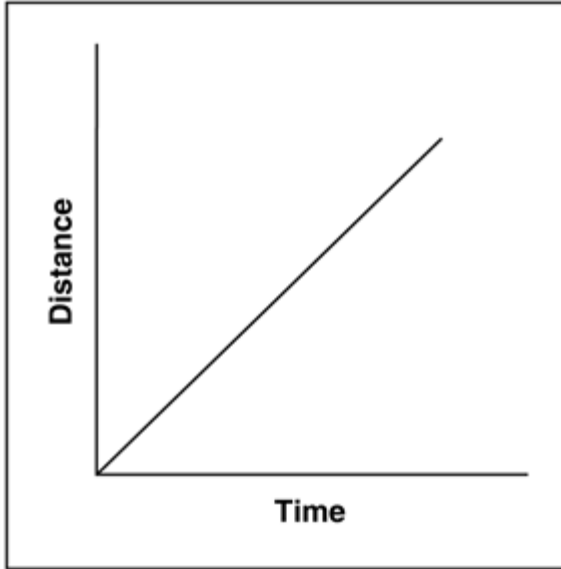
D.

74. The table below represents the data from an experiment to determine the speed of a toy car on a straight track.

Time (seconds)	Distance (centimeters)
1	50
4	200
5	250
8	x
12	600

The car is moving at a constant speed in a forward direction. Which value belongs in the cell marked with an x?

A. 300

B. 350

C. 400

D. 450

75. The graph below shows the speed of a school bus over time. During which 2 points does the bus have a negative acceleration?

The Speed of a School Bus Over Time
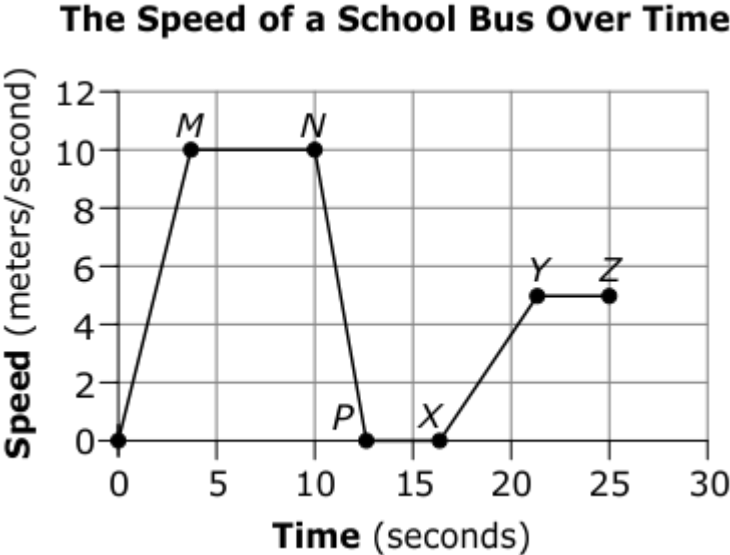
A. segment *M* to *N*

B. segment *N* to *P*

C. segment *X* to *Y*

D. segment *Y* to *Z*

76. Stephanie rode to the local farmer's market with her grandmother. The graph below illustrates their trip.

Stephanie's Trip to the Farmer's Market
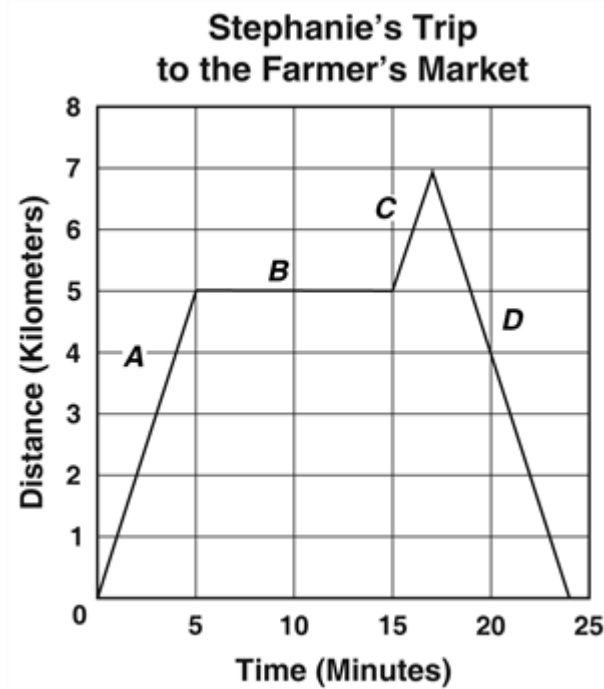
Which line segment represents the time the car was parked at the farmer's market?

A. Segment *A*

B. Segment *B*

C. Segment *C*

D. Segment *D*

77. Jack drove his car around town to do errands. The graph below represents the time he spent and the distance he traveled. During what time interval was Jack's car parked?

Jack's Errands
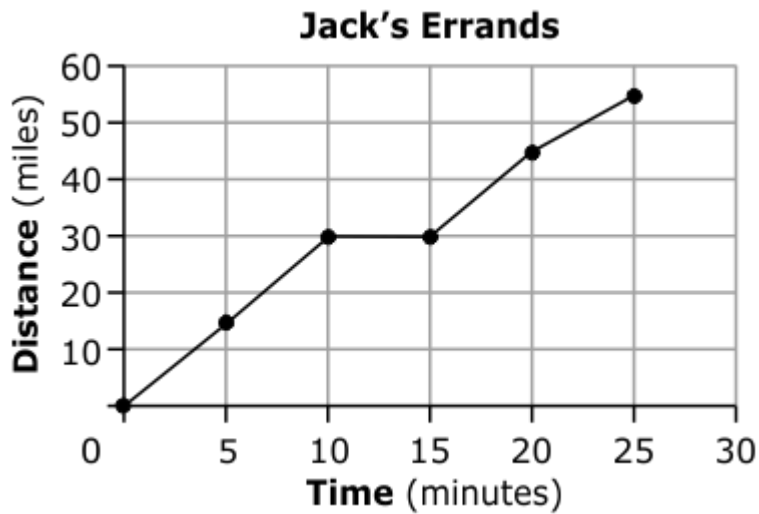
A. between 0 and 5 minutes

B. between 5 and 10 minutes

C. between 10 and 15 minutes

D. between 15 and 20 minutes

78. The graph shows the motion of four cars. All four cars are moving east.

Motion of Four Cars
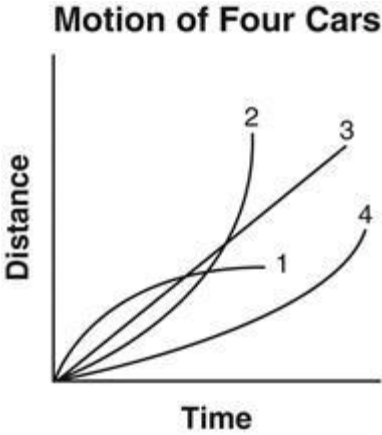
Which car has a constant velocity?

A. 1

B. 2

C. 3

D. 4

79. The graph below represents a toy car traveling a distance of 10 meters down a straight track for 60 seconds. During what time interval was the toy car traveling at a constant velocity?
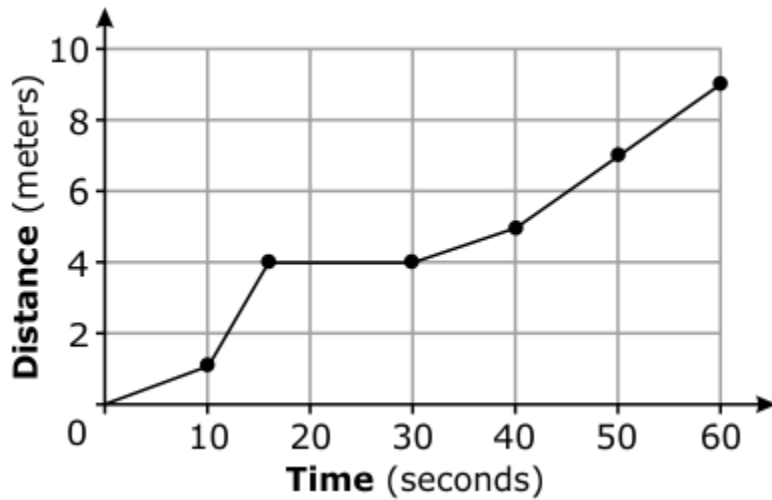
A. 0–20 seconds

B. 20–30 seconds

C. 30–50 seconds

D. 40–60 seconds

schoolnet