

Indicate whether the statement is true or false.

1. Physics is the study of matter and energy and their relationships.
 - a. True
 - b. False
2. Mass is the quantity of matter an object has.
 - a. True
 - b. False

Indicate the answer choice that best completes the statement or answers the question.

3. 1 micrometer ($1 \mu\text{m}$) equals:
 - a. 10^{-3} m
 - b. 10^{-6} m
 - c. 10^3 m
 - d. 10^6 m
4. Decide which of the following prefixes is the largest: centi-, milli-, deci-, or kilo-.
 - a. centi-
 - b. milli-
 - c. deci-
 - d. kilo-
5. Decide which of the following prefixes is the smallest: centi-, milli-, deci-, or kilo-.
 - a. centi-
 - b. milli-
 - c. deci-
 - d. kilo-

Match the following terms with their definitions:

- a. measurement
 - b. significant digits
 - c. scientific theory
 - d. scientific law
 - e. precision
 - f. physics
 - g. accuracy
6. a branch of science that involves the study of the physical world
 7. a rule that sums up related observations that describe a pattern in nature

8. a comparison between an unknown quantity and a standard
9. the valid digits in a measurement
10. the degree of exactness of a measurement
11. an explanation based on many observations supported by results
12. describes how well results of a measurement agree with the “real” value

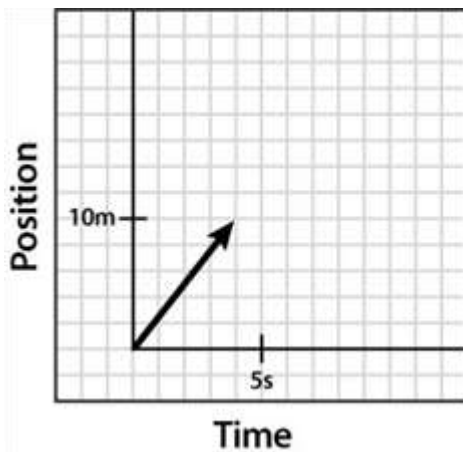
Indicate the answer choice that best completes the statement or answers the question.

13. A car is moving with a uniform speed of 15.0 m/s along a straight path. What is the distance covered by the car in 12.0 minutes?

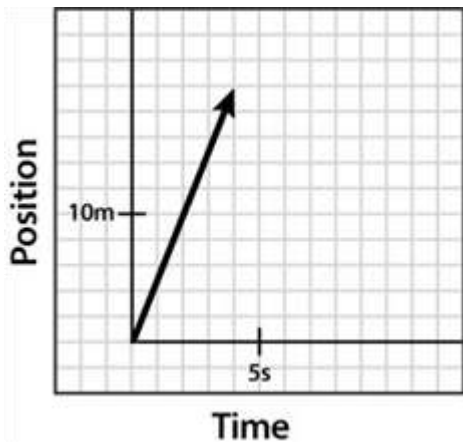
- a. 1.02×10^{-3} km
- b. 1.80×10^{-1} km
- c. 8.00×10^{-5} km
- d. 1.08×10^1 km

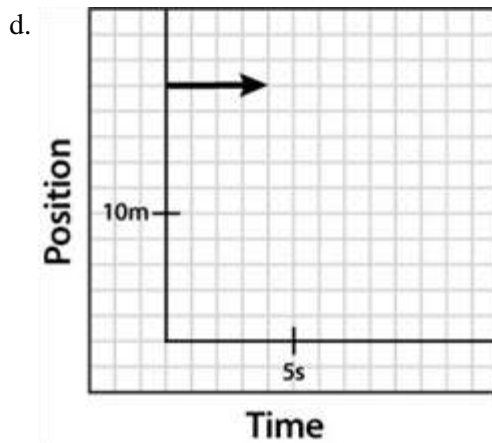
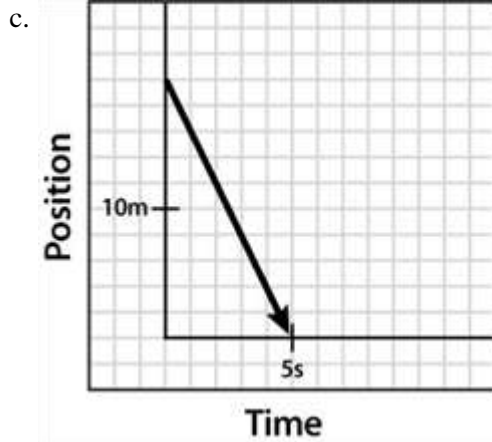
14. Construct a position-time graph that shows the forward progress of Sunny The Dog in a straight line for 20 meters over the course of 4 seconds.

a.



b.





15. Which of the following is a pair of vector quantities?

- a. Speed — Distance
- b. Velocity — Distance
- c. Velocity — Displacement
- d. Speed — Displacement

16. Which of the following is a pair of scalar quantities?

- a. velocity - distance
- b. velocity - displacement
- c. time - speed
- d. time - displacement

17. The magnitude of a vector represents its _____.

- a. velocity
- b. direction
- c. size
- d. color

Indicate whether the statement is true or false.

18. The slope of a position-time graph of an object gives the speed of the object.
- a. True
 - b. False
19. Scalar measurements have both magnitude and direction.
- a. True
 - b. False
20. The position-time graph of an object moving with a constant average velocity is always a straight line.
- a. True
 - b. False
21. Vector measurements have both magnitude and direction.
- a. True
 - b. False
22. Average speed is a scalar quantity.
- a. True
 - b. False

Match the following terms with their definitions.

- a. position-time graph
- b. particle model
- c. motion diagram
- d. displacement

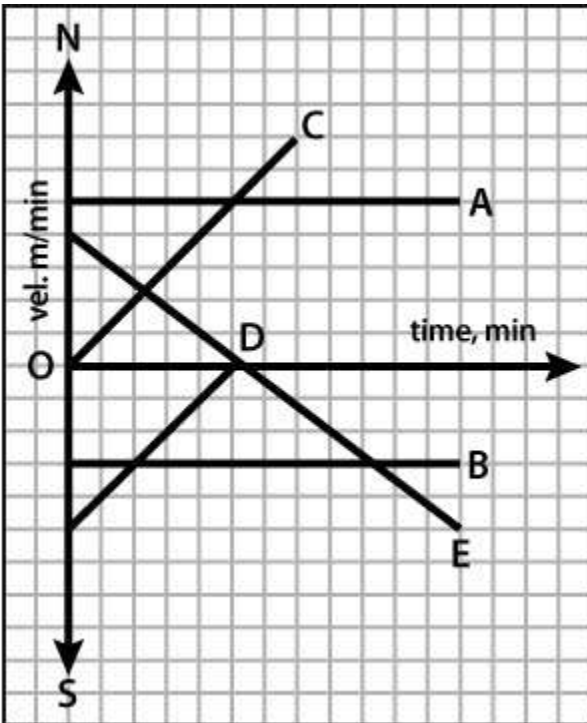
23. What represents the motion of an object?
24. What is an example of a motion diagram where the object is replaced by a series of single points?
25. What diagram can be used to find where and when two objects meet?
26. What is a change of position that has both magnitude and direction?

Indicate whether the statement is true or false.

27. Acceleration is a vector quantity.
- a. True
 - b. False
28. Acceleration can never be negative.
- a. True
 - b. False

29. The displacement of an object can be calculated by multiplying its velocity and the time interval.
- True
 - False

30. The area under a velocity-time graph is the displacement of the object.
- True
 - False

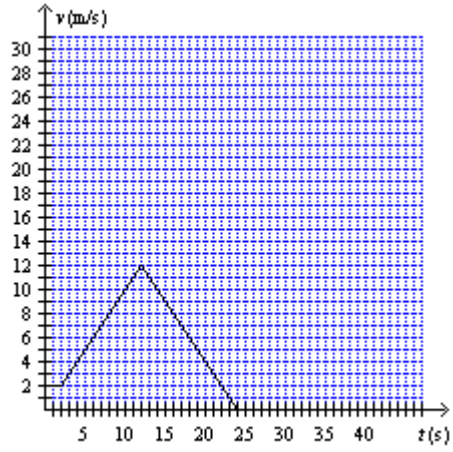


31. The objects represented by line C and line D have the same acceleration.
- True
 - False

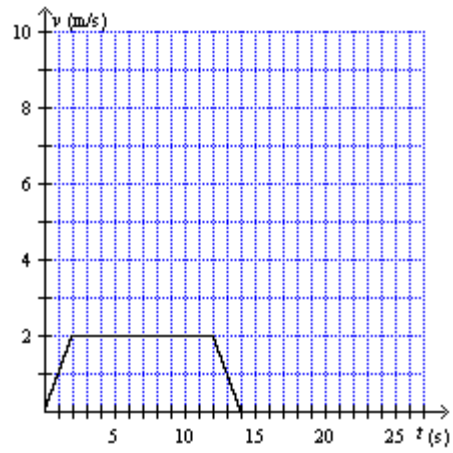
Indicate the answer choice that best completes the statement or answers the question.

32. A man starts his car from rest and accelerates at 1 m/s^2 for 2 seconds. He then continues at a constant velocity for 10 seconds until he sees a tree blocking the road and applies brakes. The car slows down at 1 m/s^2 , finally comes to rest. Which of the following graphs represents the motion correctly?

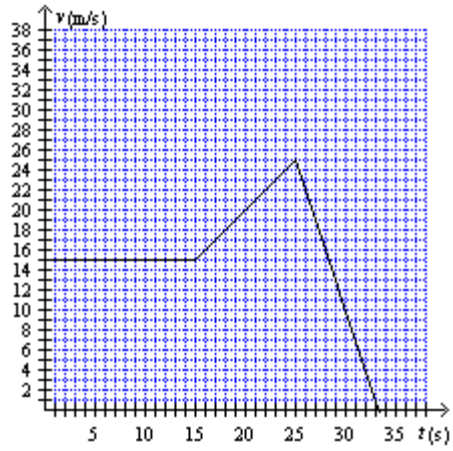
a.

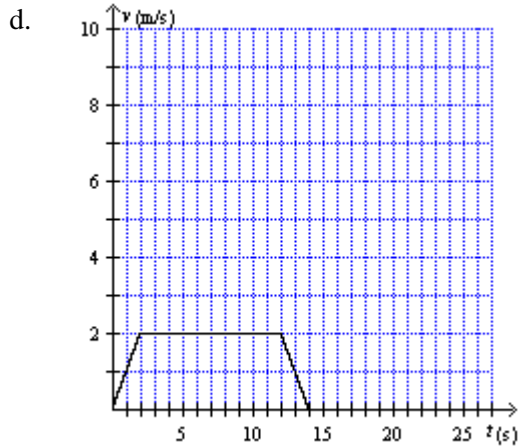


b.



c.





Indicate whether the statement is true or false.

33. Force is a scalar quantity.
 a. True
 b. False
34. A free-body diagram represents forces acting on a system.
 a. True
 b. False
35. The net force on an object is the resultant of the force vectors.
 a. True
 b. False

Indicate the answer choice that best completes the statement or answers the question.

36. Which of the following does NOT represent Newton's second law?
 a. $a = m/F_{\text{net}}$
 b. $m = F_{\text{net}}/a$
 c. $F_{\text{net}} = ma$
 d. $a = F_{\text{net}}/m$
37. When an object is in equilibrium, the net force is _____.
 a. zero
 b. positive
 c. negative
 d. changing
38. " $F_{A \text{ on } B} = -F_{B \text{ on } A}$ " is an expression of
 a. Newton's first law

- b. Newton's second law
- c. Newton's third law
- d. Fig Newton's law

39. Tension refers to

- a. the force exerted by a string.
- b. terminal velocity.
- c. dynamic displacement.
- d. free fall.

40. The normal force (F_N) refers to

- a. the parallel contact force exerted by a surface on another object.
- b. the perpendicular contact force exerted by a surface on another object.
- c. the perpendicular tension exerted by a surface on a rope.
- d. the parallel acceleration of a body at terminal velocity.

41. A weight is hung from the ceiling of an elevator by a massless string. Under which circumstances will the tension in the cord be the greatest?

- a. The elevator rises with decreasing speed.
- b. The elevator rises with increasing speed.
- c. The elevator is at rest.
- d. The elevator descends with increasing speed.

42. A weight is hung from the ceiling of an elevator by a massless string. Under which circumstances will the tension in the cord be the smallest?

- a. The elevator is at rest.
- b. The elevator rises with increasing speed.
- c. The elevator descends with decreasing speed.
- d. The elevator descends with increasing speed.

43. Two men pull a 31-kg box with forces 9.7 N and 7.6 N in the directions shown below. Find the resultant acceleration of the box and the direction in which the box moves.



9.7 N 7.6 N

44. An elevator is moving down with an acceleration of 3.36 m/s^2 . What would be the apparent weight of a 64.2-kg man in the elevator?

45. An elevator is moving down with an acceleration of 1.84 m/s^2 . A 14.0-kg block hangs from a spring balance fixed to the roof of the elevator. If the spring balance is calibrated to give measurements in kg, what is the reading on the scale?

Indicate the answer choice that best completes the statement or answers the question.

46. A 50.0 kg wooden box is pushed across a floor with a constant speed of 2.5 m/s. The coefficient of kinetic friction is 0.20. If the force being applied to the box is halved, what is the resulting acceleration on the box?

- a. -0.98 m/s^2
- b. -1.25 m/s^2
- c. -5.0 m/s^2
- d. -12.5 m/s^2

47. A 100.0 kg safe is pushed across a floor with a force of 450 N. The coefficient of kinetic friction is 0.35. What is the acceleration of the safe?

- a. -0.98 m/s^2
- b. -1.25 m/s^2
- c. -5.0 m/s^2
- d. -12.5 m/s^2

48. When adding 2 vectors together graphically, which of the following may be done?

- a. moving a vector
- b. rotating a vector
- c. changing the length of a vector
- d. changing the angle between the vectors

49. The normal force on an object always acts

- a. parallel to the surface upon which the object is resting.
- b. perpendicular to the surface upon which the object is resting.
- c. equal and opposite to the weight of the object.
- d. in the same direction as gravity.

Indicate whether the statement is true or false.

50. Projectile motion in two dimensions cannot be determined by breaking the problem into two connected one-dimensional problems.

- a. True
- b. False

51. A ball that is dropped will hit the ground at the same time as a ball that is thrown horizontally with an initial velocity of 2 m/s.

- a. True

b. False

52. The acceleration of an object in uniform circular motion always points toward the center of the circle.

a. True

b. False

Indicate the answer choice that best completes the statement or answers the question.

53. A stone is thrown horizontally from the top of a 25.00-m cliff. The stone lands at a distance of 40.00 m from the edge of the cliff. What is the initial horizontal velocity of the stone?

a. 2.260 m/s

b. 15.60 m/s

c. 17.70 m/s

d. 22.05 m/s

54. A ball is thrown horizontally at 10.0 m/s from the top of a hill 50.0 m high. How far from the base of the cliff would the ball hit the ground?

a. 23.6 m

b. 26.4 m

c. 31.9 m

d. 45.0 m

55. A ball is thrown horizontally from a hill 29.0 m high at a velocity of 4.00 m/s. Find the distance between the base of the hill and the point where the ball hits the ground.

a. 2.43 m

b. 9.73 m

c. 10.06 m

d. 3.28 m

56. A missile launches at a velocity of 30.0 m/s at an angle of 30.0° to the normal. What is the maximum height the missile attains?

a. 11.5 m

b. 27.5 m

c. 34.4 m

d. 45.9 m

57. A player kicks a football with an initial velocity of 3.00 m/s at an angle of 60.0° above the horizontal. What is the horizontal distance traveled by the football?

a. 0.312 m

b. 0.397 m

c. 0.673 m

d. 0.795 m

58. A sprinter runs at a speed of 3.00 m/s on a circular track that has a radius of 40.00 m. Find the centripetal acceleration of the sprinter.

- a. 0.225 m/s^2
- b. 4.44 m/s^2
- c. 0.750 m/s^2
- d. 0.0750 m/s^2

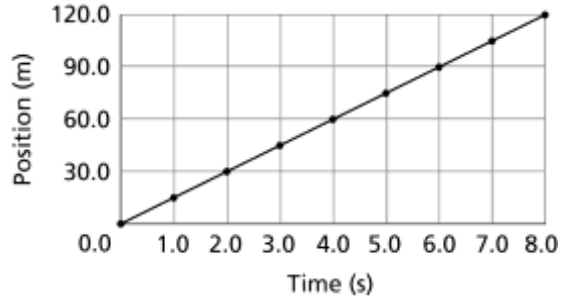
59. A 0.50-kg ball is attached to a string of 0.50 m and swung in a horizontal circle with a velocity of 1.0 m/s. Find the centripetal force of the ball.

- a. 0.50 N
- b. 1.0 N
- c. 2.0 N
- d. 2.5 N

60. A 1.00-kg ball is attached to a string of 0.50 m and swung in a horizontal circle with a velocity of 2.00 m/s. Find the centripetal acceleration.

- a. 0.25 m/s^2
- b. 2.0 m/s^2
- c. 4.0 m/s^2
- d. 8.0 m/s^2

4. The position-time graph represents part of a car trip along a straight road.



What is the average velocity of the car for the first 8.0 s?

- A 20 m/s
- B 15 m/s
- C 12 m/s
- D 8 m/s