

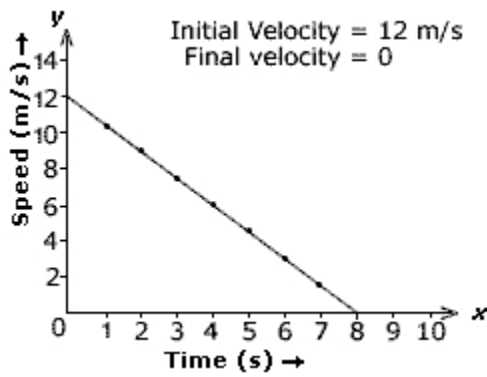
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Indicate the answer choice that best completes the statement or answers the question.

- ___ 1. Decide which of the following prefixes is the largest: centi-, milli-, deci-, or kilo-.
- a. centi-
 - b. milli-
 - c. deci-
 - d. kilo-

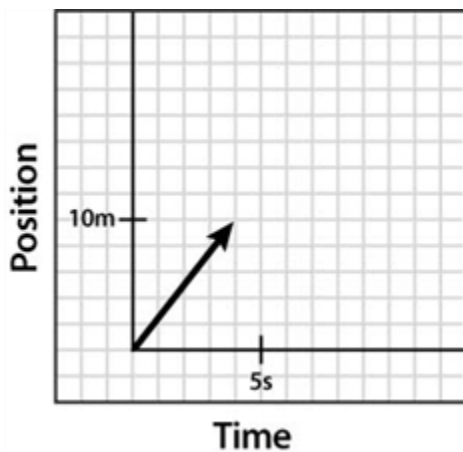
Enter the appropriate word(s) to complete the statement.

2. The acceleration of the body in the graph given below is _____.



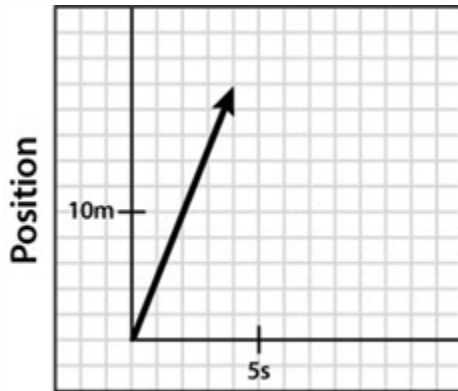
Indicate the answer choice that best completes the statement or answers the question.

- ___ 3. 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 720.0 seconds?
- a. 1.20 m
 - b. 180 m
 - c. 0.08 m
 - d. 10800 m
- ___ 4. 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.

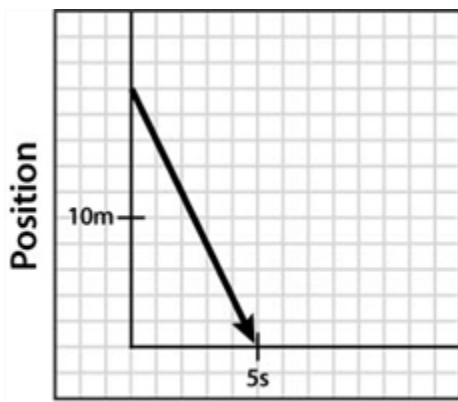


a.

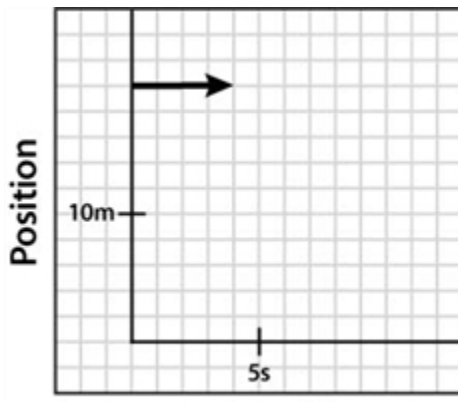
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b.



c.



d.

- ___ 5. Which of the following is a pair of vector quantities?
- a. Speed — Distance
 - b. Velocity — Distance
 - c. Velocity — Displacement
 - d. Speed — Displacement

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- ___ 6. A racehorse is running with a uniform speed of 19.17 m/s along a straightaway. What is the time it takes for the horse to cover 400 meters?
- a. 21 seconds
 - b. 2.1 seconds
 - c. 0.35 seconds
 - d. 27.6 seconds
- ___ 7. Which of the following is a pair of scalar quantities?
- a. velocity - distance
 - b. velocity - displacement
 - c. time - speed
 - d. time - displacement
- ___ 8. The magnitude of a vector represents its _____.
- a. velocity
 - b. direction
 - c. size
 - d. color

Indicate whether the statement is true or false.

- ___ 9. A time interval is a scalar quantity.
- a. True
 - b. False
- ___ 10. The position-time graph of an object moving with a constant velocity is never a straight line.
- a. True
 - b. False

Enter the appropriate word(s) to complete the statement.

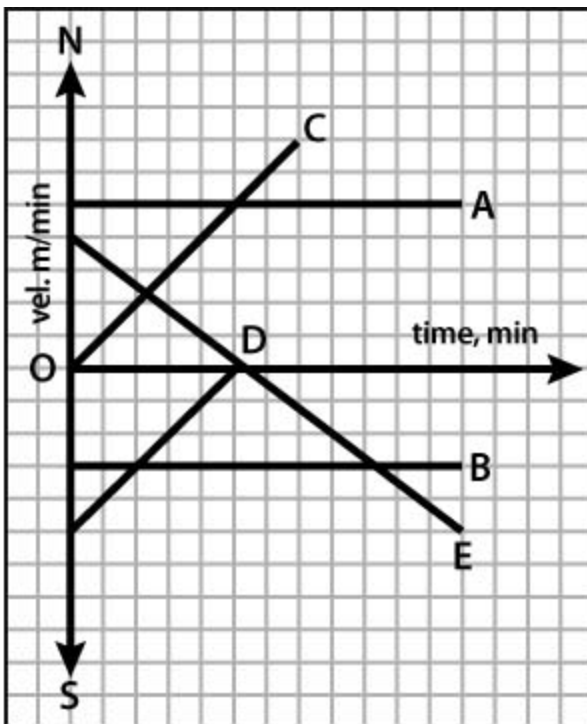
11. The vector that represents the sum of the other two vectors is called the _____.

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

- ___ 12. Given a graph of velocity v. time, what does a horizontal line represent?
- a. The object's acceleration is positive.
 - b. The object is moving at constant velocity.
 - c. The object's acceleration is negative.
 - d. The object is standing still.

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- ___ 13. The acceleration due to Earth's gravity is:
- 9.8 m/s^2
 - 98 m/s^2
 - 9.8 ft/s^2
 - 9.8 mi/s^2
- ___ 14. Which of the following is NOT an example of accelerated motion?
- a boulder falling off of a cliff in a straight path
 - an airplane taking off down a straight runway
 - a bicyclist moving in a straight line at constant speed
 - a ball being thrown straight up



- ___ 15. Which line represents an object that is in motion where the acceleration is zero and the velocity is to the north?
- Line A
 - Line B
 - Line C
 - Line D
 - Line E
- ___ 16. Which line shows both positive velocity and positive acceleration?
- Line A
 - Line B
 - Line C
 - Line D
 - Line E

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- ___ 17. The rate at which an object's velocity changes is called its _____.
a. acceleration
b. average velocity
c. displacement
d. scalar magnitude
- ___ 18. In a free body diagram, the force arrows always point _____.
a. away from the particle
b. toward the particle
c. both toward and away from the particle
d. at right angles to each other
- ___ 19. Which of the following is NOT true?
a. The net force on an object is equal to the mass of the object multiplied by the acceleration.
b. The net force exerted on an object is related in a linear fashion to the acceleration of the object.
c. An object moving at constant velocity always has a net force acting on it.
d. An object moving with constant acceleration always has a net force acting on it.
- ___ 20. 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. $a = F_{\text{net}}/m$
- ___ 21. When an object is in equilibrium, the net force is _____.
a. zero
b. positive
c. negative
d. changing
- ___ 22. Tension refers to
a. the force exerted by a string.
b. terminal velocity.
c. dynamic displacement.
d. free fall.
- ___ 23. 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.

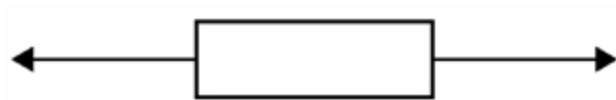
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Identify the system, forces, and agents in each situation.

24. A bird egg falls freely from a nest.

25. A tow truck uses a cable to pull a car onto the flat bed of the tow truck.

26. 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

27. 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?

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

- ___ 28. The resultant between 2 vectors can be found by placing the vectors
- a. tip to tip.
 - b. tip to tail.
 - c. tail to tail.
 - d. tip to midpoint.

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- ___ 29. A wolf spider runs 0.75 m west, then turns and runs 0.50 m south. Which choice gives the correct solution for the resultant?
- a. $R^2 = 0.75^2 + 0.50^2$
 - b. $R^2 = 0.75^2 + 0.50^2 - 2(0.75)(0.50) \cos 60$
 - c. $R^2 = 0.75^2 - 0.50^2$
 - d. $R^2 = 0.75^2 - 0.50^2 - 2(0.75)(0.50) \cos 90$
30. A cyclist goes 12.76 km east, then turns due south and rides another 5.85 km. What is the magnitude and direction of the cyclist's overall displacement?
-
-

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

- ___ 31. The path of a projectile through space is called its:
- a. equilibrant
 - b. torque
 - c. range
 - d. trajectory
- ___ 32. The movement of an object or a point mass at a constant speed around a circle that has a fixed radius is called uniform _____.
- a. circular motion
 - b. parabolic motion
 - c. elliptical motion
 - d. rotational motion
- ___ 33. An object that is shot through the air is called a
- a. protractor.
 - b. projectile.
 - c. parabola.
 - d. proboscis.
- ___ 34. The path through space followed by a projectile is called the
- a. trajectory.
 - b. transparency.
 - c. thrust.
 - d. acceleration due to gravity.

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- ___ 35. To determine the y-component of a projectile's velocity, what operation is performed on the angle of the launch?
- a. secant
 - b. tangent
 - c. cosine
 - d. sine
- ___ 36. To determine the x-component of a projectile's velocity, what operation is performed on the angle of the launch?
- a. secant
 - b. tangent
 - c. cosine
 - d. sine
- ___ 37. 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
- ___ 38. 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
- ___ 39. 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
- ___ 40. A player kicks a football at an angle of 30.0° above the horizontal. The football has an initial velocity of 20.0 m/s. Find the horizontal component of the velocity and the maximum height attained by the football.
- a. 10.0 m/s, 17.6 m
 - b. 17.3 m/s, 5.10 m
 - c. 25.1 m/s, 7.40 m
 - d. 30.3 m/s, 9.50 m

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- ___ 41. 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

42. What happens to an object's weight as it moves farther from Earth?

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

- ___ 43. Which gives the correct relationship for kinetic energy?
- a. $KE = mv$
 - b. $KE = mv^2$
 - c. $KE = mv/2$
 - d. $KE = mv^2/2$

- ___ 44. Machines make tasks easier by changing either the magnitude or the direction of the _____ needed.
- a. force
 - b. work
 - c. energy
 - d. velocity

45. In a tug-of-war, each side pulls with a force of 500 newtons, but the rope does not move. How much work is done?

46. A 1600-kg vehicle moves with a velocity of 19.5 m/s. Calculate the power required to reduce the velocity to 3.20 m/s in 11.0 s.

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47. Pulling a banner behind itself, an airplane exerts a force of 120 newtons over a distance of 55000 m. How much work does the airplane do on the banner?

48. What is the kinetic energy of a 145 kg football player moving at 0.42 m/s?

49. What is the kinetic energy of a 0.145 kg baseball moving at 42 m/s?

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

___ 50. Which type of energy is associated with a body's height above the ground?

- a. thermal energy
- b. elastic potential energy
- c. gravitational potential energy
- d. rest energy

___ 51. A gymnast falls from a height onto a trampoline. For a moment, both the gymnast's kinetic energy and gravitational potential energy are zero. How is the gymnast's mechanical energy stored for that moment?

- a. rest energy
- b. chemical energy
- c. elastic energy
- d. thermal energy

52. Andrew throws a 0.11-kg ball toward Donald, who is standing on a ledge. The ball leaves Andrew's hands at a height of 0.24 m and Donald catches it at a height of 0.82 m. Calculate the gravitational potential energy of the ball relative to the ground before being thrown.

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53. A sea turtle must crawl up a beach to lay eggs. Ignoring friction, what work must a 140 kg turtle do in lifting herself 2.5 meters above the level of the sea?

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Answer Key

1. d
2. -1.5 m/s^2
3. d
4. b
5. c
6. a
7. c
8. c
9. True
10. False
11. resultant
12. b
13. a
14. c
15. a
16. c
17. a
18. a
19. c
20. a
21. a
22. a
23. b
24. Egg -- system
Gravity & air resistance -- forces
Mass of earth and air molecules -- agents

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25. Car -- system

cable pulling -- force

resistance to being pulled -- force

tow truck winch -- agent

surface of flat bed -- agent

26. $6.8 \times 10^{-2} \text{ m/s}^2$ to left

27. 413 N

28. b

29. a

30. The two displacements represent the x- and y-components of the resultant vector.

Use $\theta = \tan^{-1} (R_y/R_x)$

$$\theta = \tan^{-1} (R_y/R_x)$$

$$\theta = \tan^{-1} (5.85/12.76)$$

$$\theta = \tan^{-1} (0.4585)$$

$$\theta = 24.6^\circ \text{ south of east}$$

$$R^2 = R_y^2 + R_x^2$$

$$R^2 = 5.85^2 + 12.76^2$$

$$R = \sqrt{197.0401}$$

$$R = 14.04 \text{ km}$$

31. d

32. a

33. b

34. a

35. d

36. c

37. c

38. c

39. b

40. b

41. c

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42. The weight of the object decreases as it moves farther from Earth.

43. d

44. a

45. No work is done, because displacement is zero.

46. 2.69×10^4 W

47. 6.6×10^7 joules

48. 13 J

49. 130 J

50. c

51. c

52. $PE_{\text{ground}} = 0.26$ J

53. 3.4×10^3 J