

JP's Physics 101 Test Bank 1

Multiple Choice

Identify the choice that best completes the statement or answers the question.

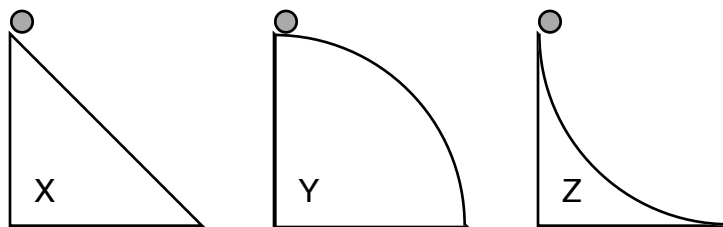
- _____ 1. When a ball is tossed straight up, it momentarily comes to a stop at the top of its path. Is it in equilibrium during this brief moment?
- A. No, because it is weightless.
 - B. Yes, because there are no net forces acting on it.
 - C. No, because its motion is changing.
 - D. Yes, because it is not moving.
 - E. Yes, because it has no inertia.
- _____ 2. A hockey puck slides across the ice at a constant speed. Is it in equilibrium?
- A. No, because friction is slowing it down.
 - B. No, because it is moving.
 - C. No, because it has inertia.
 - D. Yes, because there are no net forces acting on it.
 - E. Yes, because the ice exerts no forces on it.
- _____ 3. A book is at rest on top of a table. Which of the following is correct?
- A. There is no force acting on the book.
 - B. The book is in equilibrium.
 - C. The inertia of the book is equal to the inertia of the table.
 - D. There is no force acting on the table.
 - E. The book has no inertia.
- _____ 4. A parachutist falls toward the Earth's surface at a constant speed. How do the weight of the parachutist and the drag force on the parachute compare?
- A. There is no connection between the drag force and the weight of the parachutist.
 - B. The drag force must be significantly less than the weight of the parachutist.
 - C. The drag force must be significantly greater than the weight of the parachutist.
 - D. This problem is impossible -- a parachutist cannot fall at a constant speed.
 - E. The drag force must be equal to the weight of the parachutist.
- _____ 5. Having made a slight miscalculation, Tarzan the ape man hangs motionless on a vertical grapevine suspended from a tall tree in the depths of the jungle. Which of the following is correct?
- A. There is no tension in the grapevine.
 - B. Tarzan is in equilibrium.
 - C. Tarzan has no inertia.
 - D. There are no forces acting on Tarzan.
 - E. Tarzan has no weight.
- _____ 6. A firefighter slides down a pole at a constant speed. How do the weight of the firefighter and the force of friction between the firefighter and the pole compare?
- A. This problem is impossible -- a firefighter cannot slide at a constant speed.
 - B. The frictional force must be significantly less than the weight of the firefighter.
 - C. There is no connection between the frictional force and the weight of the firefighter.
 - D. The frictional force must be equal to the weight of the firefighter.
 - E. The frictional force must be significantly greater than the weight of the firefighter.

- _____ 7. A painter weighing 750 newtons stands on a single board scaffold that is supported at each end by a vertical rope from above. If one rope has a tension of 500 newtons and the other has a tension of 350 newtons, what is the weight of the board?
- A. 500 newtons
 - B. 250 newtons
 - C. 600 newtons
 - D. 850 newtons
 - E. 100 newtons
- _____ 8. A painter weighing 700 newtons stands on a single board scaffold that is supported at each end by a vertical rope from above. If one rope has a tension of 550 newtons and the other has a tension of 400 newtons, what is the weight of the board?
- A. 550 newtons
 - B. 300 newtons
 - C. 350 newtons
 - D. 150 newtons
 - E. 250 newtons
- _____ 9. A painter weighing 800 newtons stands on a single board scaffold that is supported at each end by a vertical rope from above. If one rope has a tension of 550 newtons and the other has a tension of 450 newtons, what is the weight of the board?
- A. 250 newtons
 - B. 100 newtons
 - C. 200 newtons
 - D. 350 newtons
 - E. 150 newtons
- _____ 10. The property of a moving object to continue moving is what Galileo called
- A. acceleration.
 - B. speed.
 - C. direction.
 - D. velocity.
 - E. inertia.
- _____ 11. The tendency of objects to resist changes in their motion is called
- A. inertia.
 - B. velocity.
 - C. acceleration.
 - D. speed.
 - E. direction.
- _____ 12. An automobile with relatively little inertia should
- A. get fairly good gas mileage.
 - B. be difficult to brake to a stop.
 - C. have room for lots of passengers.
 - D. be painted a light color, such as white.
 - E. need a big engine.
- _____ 13. Which of the following has the least amount of inertia?
- A. a helicopter
 - B. the wings of a hummingbird
 - C. your little finger
 - D. a bowling ball
 - E. the feet of an elephant

- _____ 14. In the absence of an external net force, an object at rest remains at rest, and a body in motion moves in a straight line at constant speed. This is a statement of
- A. Newton's Fourth Law of Motion.
 - B. Newton's Third Law of Motion.
 - C. Newton's First Law of Motion.
 - D. Newton's Law of Gravity
 - E. Newton's Second Law of Motion.
- _____ 15. A hockey puck sliding across the ice toward the goal is a good illustration of
- A. Newton's Second Law of Motion.
 - B. Newton's First Law of Motion.
 - C. Newton's Fourth Law of Motion.
 - D. Newton's Law of Gravity
 - E. Newton's Third Law of Motion.
- _____ 16. According to Newton's First Law of Motion,
- A. an object in motion moves in a straight line unless acted upon by a net force.
 - B. an object at rest eventually begins to move.
 - C. an object in motion moves in a parabolic trajectory unless acted upon by a net force.
 - D. an object in motion eventually comes to a halt.
 - E. an object at rest always remains at rest.
- _____ 17. According to Newton's First Law of Motion,
- A. an object at rest remains at rest unless acted upon by a net force.
 - B. an object in motion moves in a parabolic trajectory unless acted upon by a net force.
 - C. an object at rest always remains at rest.
 - D. an object at rest eventually begins to move.
 - E. an object in motion eventually comes to a halt.
- _____ 18. _____ is the rate of change of velocity due to a change in _____ .
- A. Direction; acceleration and/or speed
 - B. Speed; direction and/or acceleration
 - C. Time; the speed of light
 - D. Mass; inertia
 - E. Acceleration; speed and/or direction
- _____ 19. Acceleration is the rate of change of _____ due to a change in _____ .
- A. direction; velocity and/or speed
 - B. time; the speed of light
 - C. speed; direction and/or velocity
 - D. velocity; speed and/or direction
 - E. mass; inertia
- _____ 20. Which of the following best expresses the relation between velocity and acceleration?
- A. An object with zero acceleration must have zero velocity.
 - B. An object with zero acceleration must have non-zero velocity.
 - C. The instantaneous acceleration and velocity of an object are independent of each other.
 - D. An object with non-zero acceleration must have zero velocity.
 - E. An object with non-zero acceleration must have non-zero velocity.

- _____ 21. If the acceleration of a car is directed toward the east, the velocity of the car
- A. cannot be directed toward the north or the south.
 - B. must be directed toward the east.
 - C. may have any direction.
 - D. must be zero.
 - E. must be directed toward the west.
- _____ 22. If an object is moving, then the magnitude of its _____ cannot be zero.
- A. speed
 - B. velocity
 - C. acceleration
 - D. A and B
 - E. A, B, and C
- _____ 23. _____ is the rate of change of _____ due to a change in speed and/or direction.
- A. Velocity; inertia
 - B. Velocity; acceleration
 - C. Mass; inertia
 - D. Inertia; mass
 - E. Acceleration; velocity

In each case shown, a ball is released from rest and then rolls down the slope.



- _____ 24. In which case(s) does the ball roll with a constant acceleration?
- A. None of these.
 - B. X, Y and Z
 - C. Z
 - D. X
 - E. Y
- _____ 25. In which case(s) does the ball roll with a constant speed?
- A. X, Y and Z
 - B. Y
 - C. X
 - D. Z
 - E. None of these.
- _____ 26. In which case(s) does the downward acceleration of the ball increase with time?
- A. Z
 - B. X, Y and Z
 - C. None of these.
 - D. X
 - E. Y

- _____ 27. In which case(s) does the downward acceleration of the ball decrease with time?
- A. X
 - B. X, Y and Z
 - C. Z
 - D. None of these.
 - E. Y
- _____ 28. In which case(s) does the speed of the ball increase with time?
- A. Y
 - B. X, Y and Z
 - C. X
 - D. None of these.
 - E. Z
- _____ 29. In which case(s) does the speed of the ball decrease with time?
- A. X, Y and Z
 - B. X
 - C. None of these.
 - D. Y
 - E. Z
- _____ 30. In which case does the ball reach the bottom in the shortest time?
- A. Y
 - B. X
 - C. Z
 - D. both Y and Z
 - E. all three require the same time
- _____ 31. In which case does the ball require the longest time to reach the bottom?
- A. Y
 - B. all three require the same time
 - C. X
 - D. both Y and Z
 - E. Z
- _____ 32. A car traveling on a circular track at 50 km/hr
- A. is accelerating but has a constant speed.
 - B. has a changing speed but a constant velocity.
 - C. has a constant velocity but no acceleration.
 - D. is accelerating but has a constant velocity.
 - E. has a constant speed but no acceleration.
- _____ 33. When a car is accelerating, it must be
- A. changing its speed.
 - B. changing its color.
 - C. changing its speed or its direction.
 - D. changing its position.
 - E. changing its direction.

- _____ 34. When a car is accelerating, it must be
- A. changing its direction.
 - B. changing its position.
 - C. changing its shape.
 - D. changing its velocity.
 - E. changing its speed.
- _____ 35. A car on a straight track went from 0 to 60 mi/hr in 10 seconds. Its _____ was 6 mi/hr per second.
- A. acceleration
 - B. instantaneous velocity
 - C. free fall velocity
 - D. velocity
 - E. average speed
- _____ 36. A car travels for 10 seconds on a straight track at a constant speed of 40 m/s. What is its acceleration during this period?
- A. 40 m/s
 - B. 10 m/s²
 - C. 0 m/s²
 - D. 40 m/s²
 - E. 4 m/s²
- _____ 37. A car on a straight track is traveling at 20 m/s. If the car accelerates for 3 seconds at 5 m/s², what will be the car's speed at the end of the acceleration?
- A. 15 m/s
 - B. 65 m/s
 - C. 35 m/s
 - D. 28 m/s
 - E. 25 m/s
- _____ 38. A car on a straight track is traveling at 15 m/s. If the car accelerates for 2 seconds at 5 m/s², what will be the car's speed at the end of the acceleration?
- A. 25 m/s
 - B. 150 m/s
 - C. 40 m/s
 - D. 35 m/s
 - E. 10 m/s
- _____ 39. A car on a straight track is traveling at 15 m/s. After the car decelerates for 2 seconds at 5 m/s², what will be the car's new speed?
- A. 5 m/s
 - B. 10 m/s
 - C. 0 m/s
 - D. 7 m/s
 - E. 8 m/s
- _____ 40. A car on a straight track is traveling at 25 m/s. If the car accelerates for 3 seconds at 5 m/s², what will be the car's speed at the end of the acceleration?
- A. 10 m/s
 - B. 5 m/s
 - C. 17 m/s
 - D. 0 m/s
 - E. 15 m/s

- _____ 41. A car initially at rest accelerates in a straight line at 3 m/s^2 . What will be its speed after 4 seconds?
- A. 12 m/s
 - B. 3 m/s
 - C. 4 m/s
 - D. 0 m/s
 - E. 7 m/s
- _____ 42. A car initially at rest accelerates in a straight line at 3 m/s^2 . What will be its speed after 2 seconds?
- A. 2 m/s
 - B. 6 m/s
 - C. 0 m/s
 - D. 5 m/s
 - E. 3 m/s
- _____ 43. If a bowling ball is dropped from a height of 10 meters above the ground, it will
- A. fall downward at a constant speed until it hits the ground.
 - B. rise slowly upwards at a constant speed until it hits the moon.
 - C. fall downward at a constant velocity until it hits the ground.
 - D. fall downward at an ever-decreasing speed until it hits the ground.
 - E. fall downward at an ever-increasing speed until it hits the ground.
- _____ 44. A body in free fall in a vacuum
- A. will have the same average speed during each second of its fall.
 - B. will not be accelerated during its fall.
 - C. will have the same acceleration during each second of its fall.
 - D. will drop the same distance during each second of its fall.
 - E. will have a constant velocity during each second of its fall.
- _____ 45. While experimenting with different bodies in free fall, Galileo found that when air resistance is small enough to be neglected,
- A. large bodies accelerate more rapidly than small bodies.
 - B. all bodies accelerate at the same rate.
 - C. light bodies accelerate more rapidly than heavy bodies.
 - D. heavy bodies accelerate more rapidly than light bodies.
 - E. small bodies accelerate more rapidly than large bodies.
- _____ 46. A baseball is thrown straight up with a speed of 30 m/s. What is its acceleration immediately after its release?
- A. zero
 - B. 10 m/s^2 downward
 - C. 15 m/s upward
 - D. 30 m/s^2 downward
 - E. 30 m/s upward
- _____ 47. A baseball is thrown straight up with a speed of 40 m/s. What is its acceleration one second after its release?
- A. 30 m/s upward
 - B. zero
 - C. 20 m/s^2 downward
 - D. 10 m/s^2 downward
 - E. 20 m/s upward

- _____ 48. A baseball is thrown straight up with a speed of 20 m/s. What is its acceleration two seconds after its release?
- A. 10 m/s upward
 - B. 10 m/s² downward
 - C. zero
 - D. 20 m/s upward
 - E. 20 m/s² downward
- _____ 49. A baseball is thrown straight up at a speed of 30 m/s, then caught by the same player when it comes back down. What is the speed of the baseball the instant before it is caught?
- A. 60 m/s
 - B. 0
 - C. 30 m/s
 - D. 15 m/s
 - E. 90 m/s
- _____ 50. A bowling ball at a height of 20 meters above the ground is falling vertically at a rate of 10 meters per second. Which of these best describes its fate?
- A. It will hit the ground in more than two seconds at a speed less than 10 m/s.
 - B. It will hit the ground in less than two seconds at a speed greater than 10 m/s.
 - C. It will hit the ground in exactly two seconds at a speed of 10 m/s.
 - D. It will hit the ground in more than two seconds at a speed greater than 10 m/s.
 - E. It will hit the ground in less than two seconds at a speed less than 10 m/s.
- _____ 51. A bowling ball at a height of 36 meters above the ground is falling vertically at a rate of 12 meters per second. Which of these best describes its fate?
- A. It will hit the ground in more than three seconds at a speed greater than 12 m/s.
 - B. It will hit the ground in less than three seconds at a speed less than 12 m/s.
 - C. It will hit the ground in exactly three seconds at a speed of 12 m/s.
 - D. It will hit the ground in more than three seconds at a speed less than 12 m/s.
 - E. It will hit the ground in less than three seconds at a speed greater than 12 m/s.
- _____ 52. A bowling ball is dropped from rest from a height of 50 meters. One second after its release, the speed of the ball will be _____ (neglecting air resistance).
- A. 10 m/s
 - B. 100 m/s
 - C. 5 m/s
 - D. 20 m/s
 - E. 0 m/s
- _____ 53. During the first second after being released from rest, a free-falling ball will drop a distance of _____.
- A. 5 meters.
 - B. 0.5 meter.
 - C. 15 meters.
 - D. 10 meters.
 - E. 1 meter.

- _____ 54. A person standing at the edge of a cliff 30 m high throws one baseball upwards at 20 m/s and then another baseball downwards at 20 m/s such that both baseballs land at the base of the cliff at exactly the same time. How will the speeds of the two balls compare at the moment of impact (assuming air resistance is negligible)?
- A. Both balls will have essentially the same speed.
 - B. The 'upward' ball will be moving faster because it fell from a greater height.
 - C. The 'downward' ball will be moving faster because it did not have to change directions.
 - D. The 'upward' ball will be moving faster because it had a longer time to accelerate.
 - E. The 'downward' ball will be moving faster because it traveled a shorter distance.
- _____ 55. A bowling ball is dropped from rest from a height of 60 meters. Two seconds after its release, the speed of the ball will be _____ (neglecting air resistance).
- A. 10 m/s
 - B. 0 m/s
 - C. 40 m/s
 - D. 5 m/s
 - E. 20 m/s
- _____ 56. A train traveled a distance of 90 kilometers in 2 hours. It would be most correct to say that its _____ was 45 km/hr.
- A. average speed
 - B. acceleration
 - C. velocity
 - D. free fall velocity
 - E. instantaneous speed
- _____ 57. A car on a straight track accelerated uniformly from 0 to 60 mi/hr in 10 seconds. Its _____ was 30 mi/hr.
- A. instantaneous velocity
 - B. velocity
 - C. free fall velocity
 - D. acceleration
 - E. average speed
- _____ 58. A car on a straight track accelerated uniformly from 0 to 50 mi/hr in 20 seconds. Its _____ was 25 mi/hr.
- A. acceleration
 - B. free fall velocity
 - C. instantaneous velocity
 - D. average speed
 - E. velocity
- _____ 59. The speedometer in your car tells you the _____ of your car.
- A. average speed
 - B. inertia
 - C. acceleration
 - D. velocity
 - E. instantaneous speed
- _____ 60. The cruise control on an automobile is designed to maintain the moving vehicle at a nearly constant _____.
- A. inertia.
 - B. acceleration.
 - C. direction.
 - D. speed.
 - E. velocity.

- _____ 61. A train traveled a distance of 100 kilometers in 2 hours. Its average speed was _____ km/hr.
A. 200
B. 75
C. 100
D. 2
E. 50
- _____ 62. A train traveled a distance of 180 kilometers in 5 hours. Its average speed was _____ km/hr.
A. 36
B. 60
C. 30
D. 45
E. 90
- _____ 63. An airplane flew in a straight line for 2 hours at an average speed of 300 km/hr. It traveled a distance of _____ km.
A. 300
B. 600
C. 150
D. 500
E. 400
- _____ 64. An airplane flew in a straight line for 2 hours and traveled a distance of 500 kilometers; its average speed was _____ km/hr.
A. 500
B. 250
C. 1000
D. 750
E. 100
- _____ 65. To report the velocity of an object, we must specify both its _____ and its _____.
A. mass; length
B. direction; mass
C. speed; direction
D. length; acceleration
E. acceleration; speed
- _____ 66. To report the velocity of an object, we must specify both its speed and its _____.
A. mass
B. position
C. acceleration
D. length
E. direction
- _____ 67. To report the velocity of an object, we must specify both its _____ and its direction.
A. acceleration
B. length
C. mass
D. speed
E. position

- _____ 68. To report the _____ of an object, we must specify both its speed and its direction .
- A. acceleration
 - B. position
 - C. mass
 - D. velocity
 - E. length
- _____ 69. Assuming level ground and no air resistance, a projectile fired at an angle of 30° will have the same range as another projectile fired with the same speed at an angle of _____ .
- A. 45°
 - B. 60°
 - C. 90°
 - D. 15°
 - E. none of these -- each different projection angle produces a different range
- _____ 70. Assuming level ground and no air resistance, a projectile fired at an angle of 40° will have the same range as another projectile fired with the same speed at an angle of _____ .
- A. 50°
 - B. 20°
 - C. 80°
 - D. 60°
 - E. none of these -- each different projection angle produces a different range
- _____ 71. Assuming level ground and no air resistance, a projectile fired at an angle of 55° will have the same range as another projectile fired with the same speed at an angle of _____ .
- A. 45°
 - B. 15°
 - C. 25°
 - D. 35°
 - E. none of these -- each different projection angle produces a different range
- _____ 72. Assuming level ground and no air resistance, a projectile fired at an angle of 25° will have the same range as another projectile fired with the same speed at an angle of _____ .
- A. 65°
 - B. 45°
 - C. 55°
 - D. 75°
 - E. none of these -- each different projection angle produces a different range
- _____ 73. Assuming level ground and no air resistance, a projectile fired at an angle of 80° will have the same range as another projectile fired with the same speed at an angle of _____ .
- A. 10°
 - B. 60°
 - C. 20°
 - D. 30°
 - E. none of these -- each different projection angle produces a different range

- _____ 74. Projectile 'A' is fired at an angle of 50° above the horizontal; projectile 'B' is fired with the same speed at an angle of 40° above the horizontal. Assuming level ground and negligible air resistance, which of the following is true?
- A. 'A' will reach the same height and have a shorter range than 'B'.
 - B. 'A' will reach a greater height and have a greater range than 'B'.
 - C. 'A' will reach a greater height and have a shorter range than 'B'.
 - D. 'A' will reach a greater height and have the same range as 'B'.
 - E. 'A' will reach the same height and have the same range as 'B'.
- _____ 75. Projectile 'A' is fired at an angle of 70° above the horizontal; projectile 'B' is fired with the same speed at an angle of 20° above the horizontal. Assuming level ground and negligible air resistance, which of the following is true?
- A. 'A' will reach a greater height and have the same range as 'B'.
 - B. 'A' will reach the same height and have a shorter range than 'B'.
 - C. 'A' will reach a greater height and have a greater range than 'B'.
 - D. 'A' will reach the same height and have the same range as 'B'.
 - E. 'A' will reach a greater height and have a shorter range than 'B'.
- _____ 76. Projectile 'A' is fired at an angle of 70° above the horizontal; projectile 'B' is fired with the same speed at an angle of 30° above the horizontal. Assuming level ground and negligible air resistance, which of the following is true?
- A. 'A' will reach a greater height and have a greater range than 'B'.
 - B. 'A' will reach a greater height and have the same range as 'B'.
 - C. 'A' will reach the same height and have a shorter range than 'B'.
 - D. 'A' will reach the same height and have the same range as 'B'.
 - E. 'A' will reach a greater height and have a shorter range than 'B'.
- _____ 77. Projectile 'A' is fired at an angle of 60° above the horizontal; projectile 'B' is fired with the same speed at an angle of 20° above the horizontal. Assuming level ground and negligible air resistance, which of the following is true?
- A. 'A' will reach the same height and have the same range as 'B'.
 - B. 'A' will reach a greater height and have the same range as 'B'.
 - C. 'A' will reach a greater height and have a greater range than 'B'.
 - D. 'A' will reach the same height and have a shorter range than 'B'.
 - E. 'A' will reach a greater height and have a shorter range than 'B'.
- _____ 78. Assuming level ground and no air resistance, the maximum range of a projectile will be obtained by firing it at an angle of _____ .
- A. 55°
 - B. 75°
 - C. 45°
 - D. 65°
 - E. 85°
- _____ 79. In general, the maximum range of a projectile for a given initial speed is obtained with a projection angle of _____ above the horizon (neglecting air resistance).
- A. 30°
 - B. 75°
 - C. 90°
 - D. 45°
 - E. 60°

- _____ 80. In the absence of air resistance, the magnitude of the horizontal component of a projectile's velocity
- A. is constant until the projectile hits the ground.
 - B. increases with time until the projectile hits the ground.
 - C. decreases with time until the projectile hits the ground.
 - D. is equal to the magnitude of the vertical component of the projectile's velocity.
 - E. is equal to one half of the magnitude of the vertical component of the projectile's velocity.
- _____ 81. In the absence of air resistance, the magnitude of the vertical component of a projectile's velocity
- A. is constant until the projectile hits the ground.
 - B. always increases with time until the projectile hits the ground.
 - C. always decreases with time until the projectile hits the ground.
 - D. increases and/or decreases with time, due to the acceleration of gravity.
 - E. is equal to the magnitude of the horizontal component of the projectile's velocity.
- _____ 82. A ball is thrown at 30 m/s at an angle of 60° above the horizontal. Which of the following statements about the ball's motion is true (assuming no air resistance)?
- A. The magnitude of the velocity is constant until the ball strikes the ground.
 - B. The horizontal component of the velocity is constant until the ball strikes the ground.
 - C. The vertical component of the velocity is constant until the ball strikes the ground.
 - D. The distance traveled by the ball each second is constant until the ball strikes the ground.
 - E. Both the horizontal and vertical components of the velocity will constantly change, due to gravity.
- _____ 83. When air resistance does not affect the motion of a projectile,
- A. the horizontal and vertical components of its velocity will both change at the same rate.
 - B. the horizontal and vertical components of its velocity will both change, but at different rates.
 - C. the vertical component of its velocity will change while the horizontal component remains constant.
 - D. the horizontal component of its velocity will change while the vertical component remains constant.
 - E. the horizontal and vertical components of its velocity will remain constant.
- _____ 84. In the absence of air resistance, the magnitude of the vertical component of a projectile's acceleration
- A. always decreases with time until the projectile hits the ground.
 - B. increases and/or decreases with time, depending on the projectile's velocity.
 - C. is equal to the magnitude of the horizontal component of the projectile's acceleration.
 - D. always increases with time until the projectile hits the ground.
 - E. is constant until the projectile hits the ground.
- _____ 85. In the absence of air resistance, the magnitude of the horizontal component of a projectile's acceleration
- A. is equal to the magnitude of the vertical component of the projectile's acceleration.
 - B. increases with time until the projectile hits the ground.
 - C. is equal to one half of the magnitude of the vertical component of the projectile's acceleration.
 - D. is constant until the projectile hits the ground.
 - E. decreases with time until the projectile hits the ground.

- _____ 86. A ball is thrown horizontally off the top of a high cliff. In the absence of air resistance, the vertical distance the ball travels in the first second
- A. depends on the size of the ball – the bigger the ball, the greater the distance.
 - B. depends on the speed at which it was thrown – the higher the speed, the greater the distance.
 - C. is always the same – about five meters.
 - D. depends on the size of the ball – the smaller the ball, the greater the distance.
 - E. depends on the speed at which it was thrown – the lower the speed, the greater the distance.
- _____ 87. A ball is thrown horizontally off the top of a high cliff. In the absence of air resistance, the horizontal distance the ball travels in the first second
- A. is always the same – about five meters.
 - B. depends on the size of the ball – the bigger the ball, the greater the distance.
 - C. depends on the speed at which it was thrown – the lower the speed, the greater the distance.
 - D. depends on the size of the ball – the smaller the ball, the greater the distance.
 - E. depends on the speed at which it was thrown – the higher the speed, the greater the distance.
- _____ 88. A ball is thrown horizontally with a speed of 25 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, what will be the magnitude of the horizontal velocity component when the ball hits the ground?
- A. 5 m/s
 - B. 35 m/s
 - C. 15 m/s
 - D. 50 m/s
 - E. 25 m/s
- _____ 89. A ball is thrown horizontally with a speed of 15 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, what will be the magnitude of the horizontal velocity component when the ball hits the ground?
- A. 5 m/s
 - B. 35 m/s
 - C. 25 m/s
 - D. 50 m/s
 - E. 15 m/s
- _____ 90. A ball is thrown horizontally with a speed of 35 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, what will be the magnitude of the horizontal velocity component when the ball hits the ground?
- A. 15 m/s
 - B. 35 m/s
 - C. 25 m/s
 - D. 5 m/s
 - E. 50 m/s

- _____ 91. A ball is thrown such that the vertical component of its motion is 30 m/s upwards and the horizontal component of its motion is 20 m/s to the north. How long will it be before the ball reaches its maximum height (neglecting air resistance)?
- A. about 1.5 seconds
 - B. about 5 seconds
 - C. about 2 seconds
 - D. about 3 seconds
 - E. about 10 seconds
- _____ 92. A ball is thrown such that the vertical component of its motion is 30 m/s upwards and the horizontal component of its motion is 20 m/s to the north. How long will it be before the ball hits the ground (assuming a level surface and neglecting air resistance)?
- A. about 6 seconds
 - B. about 3 seconds
 - C. about 4 seconds
 - D. about 8 seconds
 - E. about 10 seconds
- _____ 93. A ball is thrown horizontally with a speed of 25 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, how much time will elapse before the ball hits the ground?
- A. about 1 second
 - B. about 3 seconds
 - C. about 4 seconds
 - D. about 5 seconds
 - E. about 2 seconds
- _____ 94. A ball is thrown horizontally with a speed of 25 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, how far from the tower will the ball hit the ground?
- A. 20 meters
 - B. 40 meters
 - C. 30 meters
 - D. 25 meters
 - E. 50 meters
- _____ 95. A ball is thrown horizontally with a speed of 25 m/s from the top of a tower 20 meters high. Assuming level ground below and negligible air resistance, what will be the magnitude of the vertical velocity component when the ball hits the ground?
- A. 50 m/s
 - B. 25 m/s
 - C. 10 m/s
 - D. 15 m/s
 - E. 20 m/s
- _____ 96. Which of these is the best description of the trajectory of a projectile shot at an angle of 60° above the horizontal (neglecting air resistance)?
- A. The projectile will gradually arc downward, following the curve of a circle.
 - B. The projectile will move upwards at a 60° angle in a straight line at a gradually increasing speed until it stops and then falls straight down.
 - C. The projectile will move upwards at a 60° angle in a straight line at a gradually diminishing speed until it stops and then falls straight down.
 - D. The projectile will gradually arc downward, following the curve of a parabola.
 - E. The projectile will move upwards at a 60° angle in a straight line at a constant speed until it stops and then falls straight down.

- _____ 97. Which of these is the best description of the trajectory of a projectile shot at an angle of 30° above the horizontal (neglecting air resistance)?
- A. The projectile will move upwards at a 30° angle in a straight line at a gradually diminishing speed until it stops and then falls straight down.
 - B. The projectile will gradually arc downward, following the curve of a parabola.
 - C. The projectile will gradually arc downward, following the curve of a circle.
 - D. The projectile will move upwards at a 30° angle in a straight line at a gradually increasing speed until it stops and then falls straight down.
 - E. The projectile will move upwards at a 30° angle in a straight line at a constant speed until it stops and then falls straight down.
- _____ 98. Which of these is the best description of the trajectory of a projectile shot at an angle of 45° above the horizontal (neglecting air resistance)?
- A. The projectile will gradually arc downward, following the curve of a parabola.
 - B. The projectile will gradually arc downward, following the curve of a circle.
 - C. The projectile will move upwards at a 45° angle in a straight line at a constant speed until it stops and then falls straight down.
 - D. The projectile will move upwards at a 45° angle in a straight line at a gradually increasing speed until it stops and then falls straight down.
 - E. The projectile will move upwards at a 45° angle in a straight line at a gradually diminishing speed until it stops and then falls straight down.
- _____ 99. Which of these is the best description of the trajectory of a projectile shot horizontally off a high cliff (neglecting air resistance)?
- A. The projectile will move outwards in a straight line at a gradually diminishing speed until it stops and then falls straight down.
 - B. The projectile will move outwards in a straight line at a gradually increasing speed until it stops and then falls straight down.
 - C. The projectile will gradually arc downward, following the curve of a parabola.
 - D. The projectile will move outwards in a straight line at a constant speed until it stops and then falls straight down.
 - E. The projectile will gradually arc downward, following the curve of a circle.
- _____ 100. Which of these is the best description of the trajectory of a projectile shot from the top of a high cliff at an angle of 30° below the horizontal (neglecting air resistance)?
- A. The projectile will gradually arc downward, following the curve of a circle.
 - B. The projectile will move downwards at a 30° angle in a straight line at a gradually diminishing speed until it hits the ground.
 - C. The projectile will move downwards at a 30° angle in a straight line at a constant speed until it hits the ground.
 - D. The projectile will move downwards at a 30° angle in a straight line at a gradually increasing speed until it hits the ground.
 - E. The projectile will gradually arc downward, following the curve of a parabola.

- _____ 101. Which of these is the best description of the trajectory of a projectile shot from the top of a high cliff at an angle of 60° below the horizontal (neglecting air resistance)?
- A. The projectile will gradually arc downward, following the curve of a parabola.
 - B. The projectile will gradually arc downward, following the curve of a circle.
 - C. The projectile will move downwards at a 60° angle in a straight line at a gradually increasing speed until it hits the ground.
 - D. The projectile will move downwards at a 60° angle in a straight line at a constant speed until it hits the ground.
 - E. The projectile will move downwards at a 60° angle in a straight line at a gradually diminishing speed until it hits the ground.
- _____ 102. Which of these is the best description of the trajectory of a projectile shot from the top of a high cliff at an angle of 10° below the horizontal (neglecting air resistance)?
- A. The projectile will move downwards at a 10° angle in a straight line at a constant speed until it hits the ground.
 - B. The projectile will move downwards at a 10° angle in a straight line at a gradually diminishing speed until it hits the ground.
 - C. The projectile will gradually arc downward, following the curve of a parabola.
 - D. The projectile will move downwards at a 10° angle in a straight line at a gradually increasing speed until it hits the ground.
 - E. The projectile will gradually arc downward, following the curve of a circle.
- _____ 103. The unit of force is the newton, which is equal to
- A. a $\text{kg}\cdot\text{m}^2/\text{s}^2$.
 - B. a kg/s .
 - C. a $\text{kg}\cdot\text{m}/\text{s}^2$.
 - D. a $\text{kg}\cdot\text{m}/\text{s}$.
 - E. a $\text{kg}\cdot\text{m}$.
- _____ 104. _____ is generally described as a push or a pull.
- A. Inertia
 - B. Velocity
 - C. Acceleration
 - D. Mass
 - E. Force
- _____ 105. The frictional force acting on a moving body
- A. acts opposite the acceleration of the body.
 - B. acts against the motion of the body.
 - C. acts at a right angle to the acceleration of the body.
 - D. acts in the same direction as the acceleration of the body.
 - E. acts at a right angle to the velocity of the body.
- _____ 106. A force is required to slide a book across the table at a constant speed because
- A. the natural state of a book is at rest.
 - B. all objects require forces to keep them moving.
 - C. air resistance opposes the book's motion.
 - D. friction opposes the book's motion.
 - E. gravity opposes the book's motion.

- _____ 107. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 3 m/s^2 . The force of friction that acts on the firefighter is
- A. 700 N.
 - B. 0 N.
 - C. 210 N.
 - D. 490 N.
 - E. 70 N.
- _____ 108. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 3 m/s^2 . The net force that acts on the firefighter is
- A. 210 N.
 - B. 490 N.
 - C. 70 N.
 - D. 700 N.
 - E. 0 N.
- _____ 109. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 4 m/s^2 . The force of friction that acts on the firefighter is
- A. 700 N.
 - B. 420 N.
 - C. 0 N.
 - D. 70 N.
 - E. 280 N.
- _____ 110. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 4 m/s^2 . The net force that acts on the firefighter is
- A. 700 N.
 - B. 420 N.
 - C. 0 N.
 - D. 70 N.
 - E. 280 N.
- _____ 111. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 2 m/s^2 . The force of friction that acts on the firefighter is
- A. 70 N.
 - B. 700 N.
 - C. 140 N.
 - D. 0 N.
 - E. 560 N.
- _____ 112. A firefighter with a mass of 70 kg slides down a vertical pole, accelerating at 2 m/s^2 . The net force that acts on the firefighter is
- A. 700 N.
 - B. 140 N.
 - C. 560 N.
 - D. 70 N.
 - E. 0 N.
- _____ 113. _____ is a measure of the inertia of a material object.
- A. Force
 - B. Mass
 - C. Acceleration
 - D. Velocity
 - E. Speed

- _____ 114. The _____ of an object on the Earth's surface are directly proportional to each other.
- A. force and velocity
 - B. mass and weight
 - C. speed and velocity
 - D. weight and acceleration
 - E. acceleration and mass
- _____ 115. The _____ of a book resting on a table is equal to the force of gravity acting on the book.
- A. mass
 - B. acceleration
 - C. inertia
 - D. weight
 - E. volume
- _____ 116. The kilogram is a measure of _____ while the newton is a measure of _____ .
- A. force; mass
 - B. weight; mass
 - C. mass; volume
 - D. volume; force
 - E. mass; force
- _____ 117. The newton is a measure of _____ while the kilogram is a measure of _____ .
- A. force; mass
 - B. mass; force
 - C. volume; force
 - D. mass; volume
 - E. force; weight
- _____ 118. The _____ is a measure of mass while the _____ is a measure of force.
- A. meter; newton
 - B. kilogram; newton
 - C. kilogram; meter
 - D. newton; kilogram
 - E. newton; meter
- _____ 119. The _____ is a measure of force while the _____ is a measure of mass.
- A. newton; kilogram
 - B. meter; newton
 - C. kilogram; meter
 - D. newton; meter
 - E. kilogram; newton
- _____ 120. Mass and _____ measure essentially the same property of a body, while _____ measures something slightly different.
- A. force; inertia
 - B. weight; inertia
 - C. velocity; acceleration
 - D. inertia; weight
 - E. acceleration; velocity

- ____ 121. Inertia and ____ measure essentially the same property of a body, while ____ measures something slightly different.
- A. acceleration; velocity
 - B. mass; weight
 - C. velocity; acceleration
 - D. force; mass
 - E. weight; mass
- ____ 122. Weight is best described as a type of ____ .
- A. velocity
 - B. mass
 - C. inertia
 - D. force
 - E. acceleration
- ____ 123. The Moon's gravity is $1/6$ of the Earth's gravity. The weight of a bowling ball on the Moon would be ____ its weight on the Earth.
- A. 6 times
 - B. equal to
 - C. $1/36$ of
 - D. 36 times
 - E. $1/6$ of
- ____ 124. The Moon's gravity is $1/6$ of the Earth's gravity. The weight of a bowling ball on the Earth would be ____ its weight on the Moon.
- A. equal to
 - B. 6 times
 - C. $1/36$ of
 - D. 36 times
 - E. $1/6$ of
- ____ 125. The Moon's gravity is $1/6$ of the Earth's gravity. The mass of a bowling ball on the Earth would be ____ its mass on the Moon.
- A. $1/6$ of
 - B. $1/36$ of
 - C. 6 times
 - D. 36 times
 - E. equal to
- ____ 126. The Moon's gravity is $1/6$ of the Earth's gravity. The mass of a bowling ball on the Moon would be ____ its mass on the Earth.
- A. 6 times
 - B. $1/6$ of
 - C. equal to
 - D. 36 times
 - E. $1/36$ of

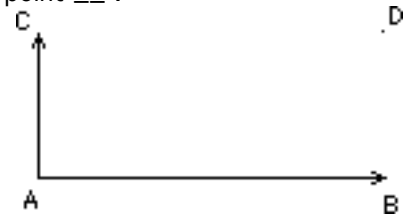
- _____ 127. If a net force acts on an object, the object will be accelerated in the direction of the force, with the magnitude of the acceleration proportional to the force and inversely proportional to the object's mass. This is a statement of
- A. Newton's Second Law of Motion.
 - B. Newton's Fourth Law of Motion.
 - C. Newton's Law of Gravity
 - D. Newton's Third Law of Motion.
 - E. Newton's First Law of Motion.
- _____ 128. Newton's Second Law of Motion says that the _____ of a body is directly proportional to the _____ and inversely proportional to the _____ of the body.
- A. mass; acceleration of the body; weight
 - B. acceleration; mass of the body; weight
 - C. acceleration; net force on the body; mass
 - D. net force; acceleration of the body; mass
 - E. net force; mass of the body; acceleration
- _____ 129. The acceleration of an object is equal to
- A. the net force on the object divided by the weight of the object.
 - B. the net force on the object divided by the mass of the object.
 - C. the mass of the object divided by the weight of the object.
 - D. the net force on the object multiplied by the mass of the object.
 - E. the net force on the object multiplied by the weight of the object.
- _____ 130. When a certain net force is applied to one brick on a frictionless surface, it accelerates at 6 m/s^2 . When the same net force is applied to two bricks that are cemented together,
- A. they accelerate at 12 m/s^2 .
 - B. they accelerate at 6 m/s^2 .
 - C. they accelerate at 2 m/s^2 .
 - D. they do not accelerate at all.
 - E. they accelerate at 3 m/s^2 .
- _____ 131. When a certain net force is applied to one brick on a frictionless surface, it accelerates at 6 m/s^2 . When the same net force is applied to three bricks that are cemented together,
- A. they accelerate at 3 m/s^2 .
 - B. they accelerate at 2 m/s^2 .
 - C. they do not accelerate at all.
 - D. they accelerate at 18 m/s^2 .
 - E. they accelerate at 6 m/s^2 .
- _____ 132. When a certain net force is applied to one brick on a frictionless surface, it accelerates at 6 m/s^2 . When twice as much net force is applied to two bricks that are cemented together,
- A. they do not accelerate at all.
 - B. they accelerate at 12 m/s^2 .
 - C. they accelerate at 6 m/s^2 .
 - D. they accelerate at 2 m/s^2 .
 - E. they accelerate at 3 m/s^2 .

- ____ 133. When a horizontal net force is applied to one brick on a frictionless surface, it accelerates at 6 m/s^2 . When the magnitude of this horizontal net force is doubled, the brick
- A. accelerates at 6 m/s^2 .
 - B. accelerates at 12 m/s^2 .
 - C. does not accelerate at all.
 - D. accelerates at 3 m/s^2 .
 - E. accelerates at 2 m/s^2 .
- ____ 134. When a horizontal force is applied to one brick on a frictionless surface, it accelerates at 6 m/s^2 . When an additional force – equal in magnitude and opposite in direction to the first – is also applied to this brick, it
- A. accelerates at 3 m/s^2 .
 - B. accelerates at 12 m/s^2 .
 - C. does not accelerate at all.
 - D. accelerates at 6 m/s^2 .
 - E. accelerates at 2 m/s^2 .
- ____ 135. A net force of 6 N will accelerate a 2 kg mass at a rate of ____ .
- A. 8 m/s^2
 - B. 12 m/s^2
 - C. 3 m/s^2
 - D. 6 m/s^2
 - E. 2 m/s^2
- ____ 136. A net force of 6 N will accelerate a 3 kg mass at a rate of ____ .
- A. 2 m/s^2
 - B. 9 m/s^2
 - C. 18 m/s^2
 - D. 3 m/s^2
 - E. 6 m/s^2
- ____ 137. The same net force that accelerates a 6 kg mass at 2 m/s^2 would accelerate a 3 kg mass at ____ .
- A. 6 m/s^2
 - B. 5 m/s^2
 - C. 2 m/s^2
 - D. 4 m/s^2
 - E. 3 m/s^2
- ____ 138. The same net force that accelerates a 6 kg mass at 2 m/s^2 would accelerate a 4 kg mass at ____ .
- A. 3 m/s^2
 - B. 6 m/s^2
 - C. 4 m/s^2
 - D. 2 m/s^2
 - E. 5 m/s^2
- ____ 139. To accelerate a 6 kg mass at 2 m/s^2 requires a net force of ____ .
- A. 6 N
 - B. 12 N
 - C. 3 N
 - D. 8 N
 - E. 2 N

- _____ 140. To accelerate a 6 kg mass at 3 m/s^2 requires a net force of _____ .
- A. 3 N
 - B. 9 N
 - C. 6 N
 - D. 18 N
 - E. 2 N
- _____ 141. A falling object is said to reach terminal speed
- A. when there is no gravitational force acting on it.
 - B. when its air resistance equals the force of gravity on it.
 - C. when its air resistance equals the force of friction on it.
 - D. when it lands on the ground.
 - E. when there is no air resistance acting on it.
- _____ 142. Two parachutists jump from an airplane together and open their identical parachutes at the same time. Which of the following is true?
- A. Both parachutists will land at the same time.
 - B. The two parachutists will fall at the same rate.
 - C. The heavier parachutist will encounter less air resistance.
 - D. The lighter parachutist will fall more rapidly.
 - E. The heavier parachutist will reach a higher terminal speed.
- _____ 143. Two parachutists jump from an airplane together and open their identical parachutes at the same time. Which of the following is true?
- A. The two parachutists will fall at the same rate.
 - B. The heavier parachutist will encounter less air resistance.
 - C. Both parachutists will land at the same time.
 - D. The lighter parachutist will reach a higher terminal speed.
 - E. The heavier parachutist will fall more rapidly.
- _____ 144. Two parachutists jump from an airplane together and open their identical parachutes at the same time. Which of the following is true?
- A. The two parachutists will fall at the same rate.
 - B. The heavier parachutist will fall more slowly.
 - C. Both parachutists will land at the same time.
 - D. The lighter parachutist will reach a higher terminal speed.
 - E. The heavier parachutist will encounter greater air resistance.
- _____ 145. As a sky diver falls just after jumping from an airplane,
- A. her speed decreases while her acceleration increases.
 - B. her speed and acceleration both increase.
 - C. her speed is constant while her acceleration increases.
 - D. her speed increases while her acceleration decreases.
 - E. her speed and acceleration both decrease.
- _____ 146. As a sky diver falls just after jumping from an airplane,
- A. her acceleration is constant while her speed increases.
 - B. her acceleration and speed both increase.
 - C. her acceleration decreases while her speed increases.
 - D. her acceleration increases while her speed decreases.
 - E. her acceleration and speed both decrease.

- ____ 147. When a falling object reaches terminal speed,
- A. its acceleration is zero, and its speed is constant.
 - B. its acceleration is increasing, and its speed is increasing.
 - C. its acceleration is constant, and its speed is zero.
 - D. its acceleration is constant, and its speed is increasing.
 - E. its acceleration is increasing, and its speed is constant.
- ____ 148. When a falling object reaches terminal speed,
- A. it begins to fall more slowly.
 - B. it begins to fall more rapidly.
 - C. it falls with a constant speed.
 - D. its motion becomes unpredictable.
 - E. it stops falling.
- ____ 149. Two tennis balls -- a normal one and one filled with water -- are dropped from the top of a tall building. Which of the following is true?
- A. The normal ball will experience more air resistance and will hit the ground first.
 - B. Both balls will hit the ground together.
 - C. The normal ball will experience less air resistance and will hit the ground first.
 - D. The water-filled ball will experience more air resistance and will hit the ground first.
 - E. The water-filled ball will experience less air resistance and will hit the ground first.
- ____ 150. If one object exerts a force on a second object, the second object exerts an equal and opposite force on the first. This is a statement of
- A. Newton's Law of Gravity.
 - B. Newton's Fourth Law of Motion.
 - C. Newton's Second Law of Motion.
 - D. Newton's Third Law of Motion.
 - E. Newton's First Law of Motion.
- ____ 151. For every action there is an equal and opposite reaction. This is a statement of
- A. Newton's Third Law of Motion.
 - B. Newton's First Law of Motion.
 - C. Newton's Second Law of Motion.
 - D. Newton's Law of Action.
 - E. Newton's Fourth Law of Motion.
- ____ 152. When A exerts a force on B, then B exerts an equal and opposite force on A. This is a statement of
- A. Newton's Third Law of Motion.
 - B. Newton's Second Law of Motion.
 - C. Newton's Law of Forces.
 - D. Newton's First Law of Motion.
 - E. Newton's Fourth Law of Motion.
- ____ 153. When a rifle is fired, the rifle exerts a force on the bullet and
- A. the bullet accelerates at the same rate as the rifle.
 - B. the bullet exerts a force of equal magnitude on the rifle.
 - C. the bullet exerts a force of lesser magnitude on the rifle.
 - D. the bullet exerts a force of greater magnitude on the rifle.
 - E. the bullet does not exert any force on the rifle.

- _____ 154. When a rock is dropped, the Earth exerts a force on the rock and
- A. the rock accelerates at the same rate as the Earth.
 - B. the rock exerts a force of lesser magnitude on the Earth.
 - C. the rock does not exert any force on the Earth.
 - D. the rock exerts a force of greater magnitude on the Earth.
 - E. the rock exerts a force of equal magnitude on the Earth.
- _____ 155. When a car accelerates along a road, the force that accelerates the car is
- A. the force of the car's exhaust gases pushing the car forward.
 - B. the force exerted by the wind on the car.
 - C. the force of gravity on the car.
 - D. the frictional force the tires exert on the road.
 - E. the frictional force the road exerts on the tires.
- _____ 156. The resultant of vectors AB and AC is a vector extending from point ___ to point ___ .



- A. B; C
 - B. C; D
 - C. A; D
 - D. C; B
 - E. B; D
- _____ 157. A boat heads due north to cross a 1-km-wide river that flows due west. If the boat's speed is 1 km/h with respect to the water and the river current is also 1 km/h, where will the boat land on the north shore?
- A. 1 km east of its original target point.
 - B. 1.41 km east of its original target point.
 - C. at its original target point.
 - D. 1.41 km west of its original target point.
 - E. 1 km west of its original target point.
- _____ 158. A boat heads due north to cross a 1-km-wide river that flows due east. If the boat's speed is 1 km/h with respect to the water and the river current is also 1 km/h, where will the boat land on the north shore?
- A. 1.41 km west of its original target point.
 - B. 1 km west of its original target point.
 - C. at its original target point.
 - D. 1.41 km east of its original target point.
 - E. 1 km east of its original target point.
- _____ 159. An airplane flying east at an airspeed of 200 km/h has a tailwind blowing from the west at 50 km/h. How far will the plane fly relative to the ground in two hours?
- A. 250 km
 - B. 400 km
 - C. 500 km
 - D. 300 km
 - E. 200 km

- _____ 160. An airplane flying east at an airspeed of 200 km/h has a tailwind blowing from the east at 50 km/h. How far will the plane fly relative to the ground in two hours?
- A. 500 km
 - B. 250 km
 - C. 200 km
 - D. 400 km
 - E. 300 km
- _____ 161. An airplane heading east at an airspeed of 100 km/h has a crosswind blowing from the north at 100 km/h. What will be the airplane's velocity relative to the ground?
- A. 141 km/h to the northeast
 - B. 100 km/h to the southeast
 - C. 100 km/h to the east
 - D. 100 km/h to the northeast
 - E. 141 km/h to the southeast
- _____ 162. An airplane heading east at an airspeed of 100 km/h has a crosswind blowing from the south at 100 km/h. What will be the airplane's velocity relative to the ground?
- A. 100 km/h to the southeast
 - B. 141 km/h to the southeast
 - C. 100 km/h to the east
 - D. 141 km/h to the northeast
 - E. 100 km/h to the northeast
- _____ 163. An airplane heading west at an airspeed of 100 km/h has a crosswind blowing from the north at 100 km/h. What will be the airplane's velocity relative to the ground?
- A. 141 km/h to the northeast
 - B. 141 km/h to the southwest
 - C. 141 km/h to the northwest
 - D. 100 km/h to the west
 - E. 141 km/h to the southeast
- _____ 164. An airplane heading west at an airspeed of 100 km/h has a crosswind blowing from the south at 100 km/h. What will be the airplane's velocity relative to the ground?
- A. 100 km/h to the west
 - B. 141 km/h to the northeast
 - C. 141 km/h to the southeast
 - D. 141 km/h to the northwest
 - E. 141 km/h to the southwest
- _____ 165. An airplane heading west at an airspeed of 100 km/h has a crosswind blowing from the south at 100 km/h. What will be the airplane's velocity relative to the ground?
- A. 141 km/h
 - B. 71 km/h
 - C. 0 km/h
 - D. 200 km/h
 - E. 100 km/h
- _____ 166. A vector quantity is completely described by specifying
- A. its color.
 - B. both its magnitude and its direction.
 - C. either its magnitude or its direction.
 - D. its magnitude.
 - E. its direction.

- _____ 167. A scalar quantity is completely described by specifying
- A. either its magnitude or its direction.
 - B. its magnitude.
 - C. its color.
 - D. both its magnitude and its direction.
 - E. its direction.
- _____ 168. _____ are examples of vector quantities.
- A. Velocity and acceleration
 - B. Mass and volume
 - C. Volume and velocity
 - D. Acceleration and time
 - E. Time and mass
- _____ 169. _____ are examples of scalar quantities.
- A. Volume and velocity
 - B. Mass and volume
 - C. Acceleration and time
 - D. Force and mass
 - E. Velocity and acceleration
- _____ 170. _____ are examples of scalar quantities.
- A. Time and mass
 - B. Acceleration and time
 - C. Velocity and acceleration
 - D. Mass and force
 - E. Force and velocity
- _____ 171. _____ are examples of vector quantities.
- A. Mass and velocity
 - B. Volume and acceleration
 - C. Volume and velocity
 - D. Acceleration and force
 - E. Force and mass
- _____ 172. Which of the following specifies a vector quantity?
- A. Mankato is about 140 kilometers from the Twin Cities.
 - B. The lectures in this class are normally 80 minutes long.
 - C. The boy had a mass of 40 kilograms.
 - D. Honest, officer, we were only going 55 miles per hour!
 - E. Gravity accelerates falling objects downward at 9.8 m/s^2 .
- _____ 173. Which of the following specifies a vector quantity?
- A. The lectures in this class are normally 80 minutes long.
 - B. The truck accelerated at 9.8 m/s^2 .
 - C. The boy had a mass of 40 kilograms.
 - D. Mankato is about 140 kilometers southwest of the Twin Cities.
 - E. Honest, officer, we were only going 55 miles per hour!