

Chapter 3 Review

Multiple Choice

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

- _____ 1. Which of the following is a physical quantity that has a magnitude but no direction?
- vector
 - scalar
 - resultant
 - frame of reference
- _____ 2. Which of the following is a physical quantity that has both magnitude and direction?
- vector
 - scalar
 - resultant
 - frame of reference
- _____ 3. Identify the following quantities as scalar or vector: the mass of an object, the number of leaves on a tree, wind velocity.
- vector, scalar, scalar
 - scalar, scalar, vector
 - scalar, vector, scalar
 - vector, scalar, vector
- _____ 4. Identify the following quantities as scalar or vector: the speed of a snail, the time it takes to run a mile, the free-fall acceleration.
- vector, scalar, scalar
 - scalar, scalar, vector
 - vector, scalar, vector
 - scalar, vector, vector
- _____ 5. Which of the following is an example of a vector quantity?
- velocity
 - temperature
 - volume
 - mass
- _____ 6. For the winter, a duck flies 10.0 m/s due south against a gust of wind with a velocity of 2.5 m/s. What is the resultant velocity of the duck?
- 12.5 m/s south
 - 12.5 m/s south
 - 7.5 m/s south
 - 7.5 m/s south
- _____ 7. A lightning bug flies at a velocity of 0.25 m/s due east toward another lightning bug seen off in the distance. A light easterly breeze blows on the bug at a velocity of 0.25 m/s. What is the resultant velocity of the lightning bug?
- 0.50 m/s
 - 0.00 m/s
 - 0.75 m/s
 - 0.25 m/s
- _____ 8. A jogger runs 10.0 blocks due east, 5.0 blocks due south, and another 2.0 blocks due east. Assume all blocks are of equal size. Use the graphical method to find the magnitude of the jogger's net displacement.
- 14.0 blocks
 - 8.0 blocks
 - 11.0 blocks
 - 13.0 blocks
- _____ 9. A cave explorer travels 3.0 m eastward, then 2.5 m northward, and finally 15 m westward. Use the graphical method to find the magnitude of the net displacement.
- 12 m
 - 5.7 m
 - 18 m
 - 15 m
- _____ 10. A student adds two vectors with magnitudes of 200 and 40. Taking into account significant figures, which is the only possible choice for the magnitude of the resultant?
- 160
 - 200
 - 300
 - 240

- _____ 19. A duck waddles 2.5 m east and 6.0 m north. What are the magnitude and direction of the duck's displacement with respect to its original position?
- a. 3.5 m at 19° north of east c. 6.5 m at 67° north of east
b. 6.3 m at 67° north of east d. 6.5 m at 72° north of east
- _____ 20. A plane flies from city A to city B. City B is 1540 km west and 1160 km south of city A. What is the total displacement and direction of the plane?
- a. 1930 km, 43.0° south of west c. 1850 km, 37.0° south of west
b. 1850 km, 43.0° south of west d. 1930 km, 37.0° south of west
- _____ 21. While following directions on a treasure map, a person walks 45.0 m south, then turns and walks 7.50 m east. Which single straight-line displacement could the treasure hunter have walked to reach the same spot?
- a. 45.6 m at 9.5° south of east c. 45.6 m at 9.5° east of south
b. 52.5 m at 21° east of south d. 45.6 m at 21° south of east
- _____ 22. A string attached to an airborne kite was maintained at an angle of 40.0° with the ground. If 120 m of string was reeled in to return the kite back to the ground, what was the horizontal displacement of the kite? (Assume the kite string did not sag.)
- a. 110 m c. 77 m
b. 84 m d. 92 m
- _____ 23. An athlete runs 110 m across a level field at an angle of 30.0° north of east. What are the east and north components, respectively, of this displacement?
- a. 64 m; 190 m c. 95 m; 55 m
b. 190 m; 64 m d. 55 m; 95 m
- _____ 24. A skateboarder rolls 25.0 m down a hill that descends at an angle of 20.0° with the horizontal. Find the horizontal and vertical components of the skateboarder's displacement.
- a. 8.55 m; 23.5 m c. 23.5 m; 73.1 m
b. 23.5 m; 8.55 m d. 73.1 m; 26.6 m
- _____ 25. Find the resultant of these two vectors: 2.00×10^2 units due east and 4.00×10^2 units 30.0° north of west.
- a. 300 units 29.8° north of west c. 546 units 59.3° north of west
b. 581 units 20.1° north of east d. 248 units 53.9° north of west
- _____ 26. What is the resultant displacement of a dog looking for its bone in the yard, if the dog first heads 55° north of west for 10.0 m, and then turns and heads west for 5.00 m?
- a. 11.2 m at 63° west of north c. 13.5 m at 37° north of east
b. 13.5 m at 37° north of west d. 62.1 m at 74° north of west
- _____ 27. A hiker walks 4.5 km at an angle of 45° north of west. Then the hiker walks 4.5 km south. What is the magnitude and direction of the hiker's total displacement?
- a. 3.5 km, 22° south of west c. 6.4 km, 45° north of west
b. 3.5 km, 22° north of west d. 6.4 km, 22° south of west
- _____ 28. Which of the following is the motion of objects moving in two dimensions under the influence of gravity?
- a. horizontal velocity c. parabola
b. directrix d. projectile motion
- _____ 29. Which of the following is an example of projectile motion?
- a. a jet lifting off a runway
b. a bullet being fired from a gun
c. dropping an aluminum can into the recycling bin
d. a space shuttle orbiting Earth

- _____ 30. Which of the following is NOT an example of projectile motion?
- a. a volleyball served over a net
 - b. a baseball hit by a bat
 - c. a hot-air balloon drifting toward Earth
 - d. a long jumper in action
- _____ 31. What is the path of a projectile?
- a. a wavy line
 - b. a parabola
 - c. a hyperbola
 - d. Projectiles do not follow a predictable path.
- _____ 32. Which of the following does NOT exhibit parabolic motion?
- a. a frog jumping from land into water
 - b. a basketball thrown to a hoop
 - c. a flat piece of paper released from a window
 - d. a baseball thrown to home plate
- _____ 33. A stone is thrown at an angle of 30.0° above the horizontal from the top edge of a cliff with an initial speed of 12 m/s. A stopwatch measures the stone's trajectory time from the top of the cliff to the bottom at 5.6 s. What is the height of the cliff? (Disregard air resistance. $g = 9.81 \text{ m/s}^2$.)
- a. 58 m
 - b. 150 m
 - c. 120 m
 - d. 180 m
- _____ 34. A track star in the long jump goes into the jump at 12 m/s and launches herself at 20.0° above the horizontal. How long is she in the air before returning to Earth? ($g = 9.81 \text{ m/s}^2$)
- a. 0.42 s
 - b. 0.83 s
 - c. 1.5 s
 - d. 1.2 s
- _____ 35. A model rocket flies horizontally off the edge of the cliff at a velocity of 50.0 m/s. If the canyon below is 100.0 m deep, how far from the edge of the cliff does the model rocket land?
- a. 112 m
 - b. 225 m
 - c. 337 m
 - d. 400 m
- _____ 36. Which of the following is a coordinate system for specifying the precise location of objects in space?
- a. x -axis
 - b. y -axis
 - c. frame of reference
 - d. diagram
- _____ 37. A passenger on a bus moving east sees a man standing on a curb. From the passenger's perspective, the man appears to
- a. stand still.
 - b. move west at a speed that is less than the bus's speed.
 - c. move west at a speed that is equal to the bus's speed.
 - d. move east at a speed that is equal to the bus's speed.
- _____ 38. A piece of chalk is dropped by a teacher walking at a speed of 1.5 m/s. From the teacher's perspective, the chalk appears to fall
- a. straight down.
 - b. straight down and backward.
 - c. straight down and forward.
 - d. straight backward.
- _____ 39. A jet moving at 500.0 km/h due east moves into a region where the wind is blowing at 120.0 km/h in a direction 30.0° north of east. What is the new velocity and direction of the aircraft relative to the ground?
- a. 607 km/h, 5.67° north of east
 - b. 620.0 km/h, 7.10° north of east
 - c. 550.0 km/h, 6.22° north of east
 - d. 588 km/h, 4.87° north of east

Name: _____

ID: A

Problem

40. A dog walks 24 steps north and then walks 55 steps west to bury a bone. If the dog walks back to the starting point in a straight line, how many steps will the dog take and in which direction will the dog walk? Use the graphical method to find the magnitude of the net displacement.