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Name:_____ Class:_____ Date:_____

Chapter 01

1. Since 1983 the standard meter has been defined in terms of which of the following?
   a. specific alloy bar housed at Sevres, France
   b. wavelength of light emitted by krypton-86
   c. distance from the Earth's equator to the North Pole
   d. the distance light travels in a certain fraction of a second
   e. None of the above

ANSWER: d

2. Since 1967 the standard definition for the second has been based on which of the following?
   a. characteristic frequency of the cesium-133 atom
   b. average solar day
   c. sidereal day
   d. Greenwich Civil Time
   e. None of the above

ANSWER: a

3. In mechanics, physicists use three basic quantities to derive additional quantities. Mass is one of the three quantities. What are the other two?
   a. length and force
   b. power and force
   c. length and time
   d. force and time

ANSWER: c

4. The prefixes which are abbreviated f, d, and T represent which of the following?
   a. 10^{-30}, 10^{-2}, and 10^{24}
   b. 10^{-15}, 10^{2}, and 10^{24}
   c. 10^{-15}, 10^{-1}, and 10^{12}
   d. 10^{-13}, 10^{2}, and 10^{24}
   e. 10^{-30}, 10^{-1}, and 10^{-2}

ANSWER: c

5. In 1983 the standard meter was redefined to what it is currently. What was the previous definition from 1960 based on?
   a. specific alloy bar housed at Sevres, France
   b. wavelength of light emitted by certain krypton atoms
   c. distance from the Earth's equator to the North Pole
   d. the distance light travels in a certain fraction of a second

ANSWER: b

6. The ratio T/m of the prefixes M and m has what value?
   a. 10^{16}
   b. 10^{14}

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c. 10^{15}

d. 10^{17}

ANSWER: c

7. A city uses 6.8×10^9 gallons of water every day. How many gallons per minute must be pumped from the reservoir to meet the city's water needs?

a. 4.7E+6

b. 7.9E+4

c. 2.8E+8

d. 6.8E+9

ANSWER: a

8. A herd of sheep eats 10 bales of hay every 4 days. If a bale of hay costs $2.85, how much will it cost to feed the sheep hay for one year?

a. $912.50

b. $2,600.63

c. $28.50

d. $3,650.00

ANSWER: b

9. Sphere A has a radius of 5.00 cm, and sphere B has a radius of 8.80 cm. What is the difference in volume between the two spheres?

a. 2 330 cm^3

b. 556 cm^3

c. 6 990 cm^3

d. 165 cm^3

ANSWER: a

10. One mole of ammonia (NH_3) has a mass of 17.0 g, and one mole is equal to 6.02×10^{23} molecules. How many hydrogen (H) atoms are in 55.0 g of ammonia? Note that each molecule of ammonia has 3 hydrogen atoms.

a. 5.84E+24

b. 1.95E+24

c. 3.07E+25

d. 6.49E+23

ANSWER: a

11. Which formula is dimensionally consistent with an expression yielding a value for velocity? (*a* is acceleration, *x* is distance, and *t* is time)

a. v/t^2

b. vx^2

c. v^2/t

d. at

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ANSWER: d

12. Which expression is dimensionally consistent with an expression that would yield a value for time^{-1}? (v is velocity, x is distance, and t is time)

a. v/x

b. v^2/x

c. x/t

d. v^2t

ANSWER: a

13. If the displacement of an object, x, is related to velocity, v, according to the relation $x = Av$, the constant, A, has the dimension of which of the following?

a. acceleration

b. length

c. time

d. area

ANSWER: c

14. The speed of a boat is often given in knots. If a speed of 5 knots were expressed in the SI system of units, the units would be:

a. m.

b. s.

c. m/s.

d. kg/s.

ANSWER: c

15. If a is acceleration, v is velocity, x is position, and t is time, then which equation is not dimensionally correct?

a. $t = x/v$

b. $a = v^2/x$

c. $v = a/t$

d. $t^2 = 2x/a$

ANSWER: c

16. Areas always have dimensions ____ while volumes always have dimensions ____.

a. m^2, m^3

b. L^2, L^3

c. Both a and b are correct.

d. No answer is correct because of the "always."

ANSWER: b

17. When SI units are plugged into an equation, it is found that the units balance. Which of the following can we expect to be true for this equation?

a. The equation will be dimensionally correct.

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b. The equation will be dimensionally correct except sometimes in cases when the right-hand side of the equation has more than one term.
c. The equation will not be dimensionally correct.
d. All constants of proportionality will be correct.

ANSWER: a

18. Suppose an equation relating position, x, to time, t, is given by $x = bt^3 + ct^4$, where b and c are constants. The dimensions of b and c are respectively:

a. T^3, T^4.
b. $1/T^3$, $1/T^4$.
c. L/T^3, L/T^4.
d. $L^2 \cdot T^3$, $L^2 \cdot T^4$.

ANSWER: c

19. Volume can be measured in units of m^3. Which of the following unit combinations also result in volume?

a. ft^2/m
b. $cm \cdot ft$
c. $cm^2 in.$
d. $m^2 \cdot cm \cdot ft$

ANSWER: c

20. Modern electroplaters can cover a surface area of 75.0 m^2 with one troy ounce of gold (volume = 1.611 cm^3). What is the thickness of the electroplated gold?

a. 2.15E–8 m
b. 1.07E–8 m
c. 1.43E–8 m
d. 4.30E–8 m
e. None of the above

ANSWER: a

21. The basic function of an automobile's carburetor is to atomize the gasoline and mix it with air to promote rapid combustion. Assume that 30.0 cm^3 of gasoline is atomized into N spherical droplets. Each droplet has a radius of 1.0×10^{-5} m. Find the total surface area of these N spherical droplets.

a. 3.0E+4 cm^2
b. 1.2E+5 cm^2
c. 1.8E+5 cm^2
d. 9.0E+4 cm^2
e. 1.1E+5 cm^2

ANSWER: d

22. On planet Z, the standard unit of length is the foose. Ann the Astronaut is 5.2 feet tall on Earth. She lands on planet Z

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and is measured to be 88 foosi tall. Her partner Rachael is 92 foosi tall. How tall is Rachael on Earth?

a. 5.9 feet
b. 5.4 feet
c. 5.2 feet
d. 5.1 feet
e. 5.6 feet

ANSWER: b

23. A cereal box has the dimensions of 0.14 m × 0.22 m × 0.070 m. If there are 3.28 feet per meter, then what is the volume of the box in cubic feet?

a. 7.6E–2 cubic feet
b. 2.3E–2 cubic feet
c. 2.7E–1 cubic feet
d. 3.9E–3 cubic feet
e. 1.3E–2 cubic feet

ANSWER: a

24. A cement truck can pour 160 cubic yards of cement per hour. Express this in ft^3/min.

a. 480 ft^3/min
b. 2.67 ft^3/min
c. 24.0 ft^3/min
d. 8.00 ft^3/min
e. 72.0 ft^3/min

ANSWER: e

25. A furlong is a distance of 220 yards. A fortnight is a time period of two weeks. A race horse is running at a speed of 6.00 yards per second. What is his speed in furlongs per fortnight?

a. 3.30E+4 furlongs/fortnight
b. 4.71E+3 furlongs/fortnight
c. 3.31E+4 furlongs/fortnight
d. 3.33E+4 furlongs/fortnight
e. 3.28E+4 furlongs/fortnight

ANSWER: a

26. The distance to a hypothetical galaxy is estimated at about 7×10^6 light years. A light year is the distance traveled by light in one year; if the speed of light is 3×10^8 m/s, about how far is it from our galaxy to this hypothetical galaxy? (1 year = 3.15×10^7 s)

a. 7E+21 m
b. 1E+9 m
c. 7E+22 m
d. 7E+5 m

ANSWER: c

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27. Water flows into a swimming pool at the rate of 7.0 gal/min. The pool is 17 ft wide, 32 ft long and 7.0 ft deep. How long does it take to fill? (1 U.S. gallon = 231 cubic inches)

a. 34 hours
b. 68 hours
c. 67 hours
d. 136 hours
e. 680 hours

ANSWER: b

28. When NASA was communicating with astronauts on the Moon, the time from sending on the Earth to receiving on the Moon was 1.28 s. Find the distance from Earth to the Moon. (The speed of radio waves is 3.00×10^8 m/s.)

a. 240 000 km
b. 384 000 km
c. 480 000 km
d. 768 000 km

ANSWER: b

29. The mass of a star is 8.0×10^{30} kg, and the mass of a hydrogen atom is 1.67×10^{-27} kg. If we assume that the star is mostly composed of hydrogen, approximately how many atoms are there in the star?

a. 1.3E+4 atoms
b. 2.1E–58 atoms
c. 4.8E+57 atoms
d. 8.0E+30 atoms

ANSWER: c

30. The information on a one-gallon paint can is that the coverage, when properly applied, is 440 ft^2. One gallon is 231 in^3. What is the average thickness of the paint in such an application?

a. 3.6E–3 in
b. 5.3E–1 in
c. 4.4E–2 in
d. 1.3E–2 in
e. 1.6E–1 in

ANSWER: a

31. The distance from New York to London is 3 470 miles. If a plane takes 6.0 hours to fly this distance, what is the plane's average speed in kilometers per hour? 1 mile = 1.609 km.

a. 2 200
b. 620
c. 390
d. 930

ANSWER: d

32. On planet Q the standard unit of volume is called the guppy. Space travelers from Earth have determined that one liter

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= 39.0 guppies. How many guppies are in 230 liters?

a. 8 970 guppies
b. 9 010 guppies
c. 8 740 guppies
d. 9 200 guppies
e. 8 930 guppies

ANSWER: a

33. Which one of the choices below represents the preferred practice regarding significant figures when adding the following: 15.9 + 14 + 77.68 + 6.898?

a. 114.4780
b. 114.478
c. 114.48
d. 114.5
e. 114

ANSWER: e

34. Which one of the choices below represents the preferred practice regarding significant figures when multiplying the following: 15.0 × 5.6 × 2.33?

a. 200
b. 195.720
c. 195.72
d. 195.7
e. 196

ANSWER: a

35. Calculate $(0.83 + 0.049)(4.4 \times 10^3)$, keeping only significant figures.

a. 3 900
b. 3 868
c. 3 886
d. 4 000

ANSWER: a

36. The length and width of a standard sheet of paper is measured, and then the area is found by calculation to be 91.50 $in.^2$. The number of significant figures in the width measurement must be at least

a. 1.
b. 2.
c. 3.
d. 4.
e. 5.

ANSWER: c

37. How many significant figures does the number 3 600 have?

a. 1

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b. 2
c. 3
d. 4
e. One cannot tell with certainty when the number is written in the given form, but it will be one of the other given answers.

ANSWER: e

38. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 6 and 7 cm, how many significant figures will result if you only use the part of the meter stick between the 1-cm and 9-cm positions?

a. 2
b. 3
c. 4
d. 5
e. more than 5

ANSWER: b

39. The number 0.03 has how many significant figures?

a. 2
b. 3
c. 5
d. 6
e. 7

ANSWER: a

40. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 8 and 9 cm, how many significant figures will result if you only use the part of the meter stick between the 82-cm and 93-cm positions?

a. 0
b. 2
c. 3
d. 4
e. more than 4

ANSWER: c

41. Assume when using a meter stick measuring can be done so that the last significant figure is in the tenth of a millimeter digit. If you are measuring an object with length between 25 and 53 cm, how many significant figures will result if you only use the part of the meter stick between the 3-cm and 85-cm positions?

a. 1
b. 2
c. 3
d. 4
e. more than 4

ANSWER: d

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42. There are other ways of expressing uncertainty besides significant figures. For example, suppose a quantity is known to have a value between 20.4 and 20.0, and our best estimate of the value is midrange at 20.2. We could write the number as 20.2 +/− 0.2 and say that the number has a 1% uncertainty. We would also say it has 3 significant figures. If we square a number with 1% uncertainty (i.e., 2 parts in about 200) and 3 significant figures, what results?

a. A number with 1% uncertainty and 3 significant figures.
b. A number with 2% uncertainty and 3 significant figures.
c. A number with 2% uncertainty and 2 significant figures.
d. A number with 1% uncertainty and 2 significant figures.

ANSWER: b

43. Multiplying a 2-significant-figure number by a 4-significant-figure number and then dividing the product by a seven-significant-figure number yields a number with how many significant figures?

a. 6/7
b. 1
c. 2
d. 13
e. 8/7

ANSWER: c

44. A rectangular-shaped patio has a base length equal to (24.5 ± 0.2) m and a height equal to (9.3 ± 0.1) m. What is the area of the patio, including its uncertainty?

a. 228 ± 4
b. 228 ± 2
c. 228 ± 23
d. 228 ± 6

ANSWER: a

45. A marble has a radius of 16 mm. Approximately how many marbles will fit in a cube-shaped container with each side equal to 36 cm?

a. 20
b. 510
c. 1 420
d. 80

ANSWER: c

46. Approximately how many water molecules are in a lake with a volume of 12 100 km^3? A water molecule measures approximately 2.75×10^{-10} m in length.

a. 2E+15
b. 5E+22
c. 4E+14
d. 6E+41

ANSWER: d

47. How long has it been that scientists have accepted that the nucleus of the atom consists of neutrons and protons? Think of your answers in terms of order of magnitude.

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a. about a decade
b. about a century
c. about a thousand years
d. since Aristotle

ANSWER: b

48. For which of the values below is $x > x^7$?
a. $x = -2.0$
b. $x = 0$
c. $x = 1.0$
d. $x = 2.0$
e. $x = 4.0$

ANSWER: a

49. Assume everyone in the United States consumes one soft drink in an aluminum can every two days. If there are 270 million Americans, about how many tons of aluminum need to be recycled each year if each can weighs 1/15 pound and one ton = 2 000 pounds?
a. 450 000 tons
b. 1.6 million tons
c. 3.3 million tons
d. 0.82 million tons
e. 410 000 tons

ANSWER: b

50. A physics class in a large lecture hall has 150 students. The total mass of the students is about ____ kg.
a. 10^4
b. 10^5
c. 10^6
d. 10^7
e. 10^8

ANSWER: a

51. An apartment has 1 100 ft^2 of floor space. What is the approximate volume of the apartment?
a. 10^2 ft^3
b. 10^3 ft^3
c. 10^4 ft^3
d. 10^5 ft^3
e. 10^6 ft^3

ANSWER: c

52. A room in a house has a floor area of 110 ft^2. Which of the following is most likely the approximate volume of the

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room?

a. 3 m^3

b. 30 m^3

c. 300 m^3

d. 3 000 m^3

e. 10 m^3

ANSWER: b

53. What is the distance between the two polar coordinates (2.0, 30°) and (9.0, 145°)?

a. 6.0

b. 10.0

c. 9.8

d. 9.2

ANSWER: b

54. Amir drives his ATV from coordinates (5.0 km, 25°) directly to (25.0 km, 45°) in 45 minutes. What is the ATV's speed?

a. 0.5 km/h

b. 20.4 km/h

c. 27.2 km/h

d. 34.0 km/h

ANSWER: c

55. A mosquito flies diagonally from a corner at the floor of a rectangular room, with coordinates (0, 0, 0) to the opposite corner at the ceiling, with coordinates (5.5, 3.75, *h*) m at a rate of 0.8 m/s. If it takes the mosquito 11 seconds to make the direct flight, what is *h*?

a. 5.8 m

b. 6.7 m

c. 8.5 m

d. 8.3 m

ANSWER: a

56. Which point is nearest the *x*-axis?

a. (1, 7)

b. (–3, –6)

c. (–7, 5)

d. (–6, –4)

e. (2, 3)

ANSWER: e

57. If point A is located at coordinates (–10, 7) and point B is located at coordinates (8, –8), what is the distance from A to B if the units of the coordinated system are meters?

a. 549 m

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b. 23 m
c. 28 m
d. 33 m
e. 26 m

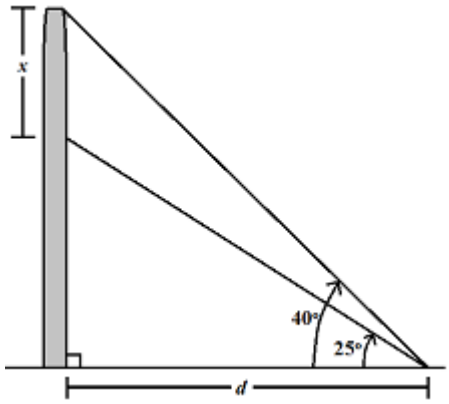
ANSWER: b

58. Each edge of a cube has a length of 12.7 cm. What is the length of a diagonal of the cube going through the center of the cube?

a. 24.0 in.
b. 22.0 in.
c. 25.5 in.
d. 20.5 in.
e. 8.7 in.

ANSWER: e

59.



Two wires support a post, with dimensions as shown in the figure. If d = 14 m, what is the value of x?

a. 7.5 m
b. 6.5 m
c. 18.3 m
d. 5.2 m

ANSWER: d

60. A surveyor stands 100 m from the base of a building, and uses a transit to determine that the angle of elevation to the building's roof is 19.0°. If the transit height is 0.80 m, what is the height of the building?

a. 94.6 m
b. 95.4 m
c. 35.2 m
d. 34.4 m

ANSWER: c

61. Suppose the interior angles of a triangle are φ_1, φ_2, and φ_3, with $\varphi_1 > \varphi_2 > \varphi_3$. Which side of the triangle is the shortest?

a. The side opposite φ_1.

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b. The side opposite φ_2.

c. The side opposite φ_3.

d. More information is needed unless the triangle is a right triangle.

ANSWER: c

62. A right triangle has sides 10 m, 5 m, and 11 m. The smallest angle of this triangle is nearest

a. 32°.

b. 27°.

c. 22°.

d. 63°.

e. Not attainable since this is not a right triangle.

ANSWER: b

63. If $\phi = 90° - \theta$, what is the value of $\sin^2 \phi + \sin^2 \theta$?

a. 0

b. 1

c. −1

d. The answer depends on θ.

ANSWER: b

64. A triangle has sides of length 7 cm and 11 cm. If the triangle is a right triangle, which of the following could be the length of the third side, to the nearest centimeter?

a. 11 cm

b. 8 cm

c. 16 cm

d. 17 cm

e. 7 cm

ANSWER: b

65. A train slowly climbs a 400-m mountain track which is at an angle of 8.0° with respect to the horizontal. How much altitude does it gain?

a. 55.7 m

b. 200 m

c. 60.7 m

d. 396 m

e. 400 m

ANSWER: a

66. Consider the sine of any angle between 30° and 40°. If the angle were doubled, what would happen to the sine of the angle?

a. It would double.

b. It would more than double.

c. It would increase but be less than double.

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d. In different cases, it could do any of the above.

ANSWER: c

67. Consider the cosine of any angle between 35° and 40°. If the angle were doubled, what would happen to the cosine of the angle.

a. It would halve.

b. It would decrease to less than half its original value.

c. It would decrease but be more than half its original value.

d. In different cases, it could do any of the above.

ANSWER: b

68. If θ and φ are each first quadrant angles, which of the following must be true if $\sin \theta = \cos \varphi$?

a. $\theta + \varphi = \pi$ rad

b. $\theta + \varphi = 90°$

c. $\theta - \varphi = \pi/2$ rad

d. $\theta = \varphi$

ANSWER: b

69. A high fountain of water is in the center of a circular pool of water. You walk the circumference of the pool and measure it to be 190 meters. You then stand at the edge of the pool and use a protractor to gauge the angle of elevation of the top of the fountain. It is 55°. How high is the fountain?

a. 25 m

b. 53 m

c. 86 m

d. 43 m

e. 48 m

ANSWER: d

70. Which of the following is not a vector quantity?

a. mass

b. acceleration

c. displacement

d. velocity

ANSWER: a

71. Which type of quantity is characterized by both magnitude and direction?

a. scalar

b. vector

c. trigonometric

d. algebraic variable

ANSWER: b

72. Which of the following is an example of a vector quantity?

a. velocity

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b. temperature
c. volume
d. mass

ANSWER: a

73. When we subtract a velocity vector from another velocity vector, the result is
a. another velocity.
b. an acceleration.
c. a displacement.
d. a scalar.

ANSWER: a

74. When we add a displacement vector to another displacement vector, the result is
a. a velocity.
b. an acceleration.
c. another displacement.
d. a scalar.

ANSWER: c

75. Vector $\vec{\mathbf{A}}$ points north, and vector $\vec{\mathbf{B}}$ points east. If $\vec{\mathbf{C}} = \vec{\mathbf{B}} - \vec{\mathbf{A}}$, then vector $\vec{\mathbf{C}}$ points
a. north of east.
b. south of east.
c. north of west.
d. south of west.

ANSWER: b

76. When three vectors are added graphically and form a closed triangle, the largest enclosed angle between any two of the vectors cannot be greater than
a. 60°.
b. 90°.
c. 180°.
d. No maximum exists.

ANSWER: c

77. Vector $\vec{\mathbf{A}}$ is 2 m long, and vector $\vec{\mathbf{B}}$ is 5 m long. The length of the sum of the vectors must be
a. 6 m.
b. 7 m.
c. 13 m.
d. some value from 3 m to 7 m.
e. 3 m.

ANSWER: d

78. Two ships set sail from the same port. Ship A sails a distance of 35.0 kilometers in a direction 30.0° north of east, and

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drops anchor. Ship B sails due south. When ship B is 30.0 km from the port, how far apart are the ships?

a. 46.1 km
b. 56.3 km
c. 65.0 km
d. 75.9 km

ANSWER: b

79. Terrence goes for a walk. He walks 2.0 km north, then turns and walks 4.0 km south of east. What is his displacement vector? Take east to be in the $+\hat{i}$-direction and north to be in the $+\hat{j}$ -direction.

a. $(2.0\,\hat{i} + 4.0\,\hat{j})$ km

b. $(2.8\,\hat{i} - 0.8\,\hat{j})$ km

c. $(4.8\,\hat{i} + 5.7\,\hat{j})$ km

d. $(5.7\,\hat{i} - 2.8\,\hat{j})$ km

ANSWER: b

80. Vector A is $2.0\,\hat{i} + 3.5\,\hat{j}$. Vector B is $-3.1\,\hat{i} - 3.1\,\hat{j}$. What is A + 2B?

a. $-4.2\,\hat{i} + -2.7\,\hat{j}$

b. $-1.1\,\hat{i} - 0.4\,\hat{j}$

c. $5.1\,\hat{i} + 6.6\,\hat{j}$

d. $8.2\,\hat{i} + 9.7\,\hat{j}$

ANSWER: a

81. An airplane takes off due west at an angle of 16.0° with the horizontal. When the airplane is at a vertical height of 400 ft, what is its displacement vector? Let east be the $+x$ direction and $+z$ be upwards.

a. $(385\,\hat{i} + 400\,\hat{k})$ ft

b. $(-110\,\hat{i} - 400\,\hat{k})$ ft

c. $(717\,\hat{i} - 400\,\hat{k})$ ft

d. $(-1\,390\,\hat{i} + 400\,\hat{k})$ ft

ANSWER: d

82. Vectors $\vec{A}$, $\vec{B}$, and $\vec{C}$ have magnitudes 6, 11, and 22. When these vectors are added, what is the least possible magnitude of their addition?

a. 25
b. 15
c. 5
d. 3

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ANSWER: c

83. Of vectors with lengths 5 m, 3 m, and 4 m, which has the greatest magnitude *x* component?
a. the one with length 5 m
b. the one with length 3 m
c. the one with length 4 m
d. It could be any of the three.

ANSWER: d

84. Vector $\vec{\mathbf{A}}$ is 5 m long and vector $\vec{\mathbf{B}}$ is 12 m long. The length of the sum of the vectors must be:

a. some value from 7 m to 17 m.
b. 13 m.
c. 17 m.
d. 8 m.

ANSWER: a

85. A taxicab moves five blocks due north, five blocks due east, and another three blocks due north. Assume all blocks are of equal size. How far is the taxi from its starting point?
a. 13 blocks
b. 9.4 blocks
c. 9.2 blocks
d. 8.6 blocks

ANSWER: b

86. Find the sum of the following two vectors: (i) 50 units due east and (ii) 100 units 30° south of west.
a. 100 units 30° south of west
b. 62 units 54° south of west
c. 87 units 60° south of west
d. 62 units 15° south of west

ANSWER: b

87. Vector 1 is 7 units long and is at 70°. Vector 2 is 5 units long and is at 155°. Vector 3 is 3 units long and is at 225°. Which vector has equal-magnitude components?
a. Vector 1
b. Vector 2
c. Vector 3
d. None of the vectors has equal-magnitude components.

ANSWER: c

88. A student adds two vectors with magnitudes of 200 and 70. Which one of the following is the only possible choice for the magnitude of their sum?
a. 100
b. 280
c. 200

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d. 70

ANSWER: c

89. Arvin the Ant travels 30 cm eastward, then 25 cm northward, and finally 10 cm westward. In what direction is Arvin now in with respect to his starting point?

a. 59° N of E
b. 29° N of E
c. 29° N of W
d. 51° N of E

ANSWER: d

90. Vector $\vec{\mathbf{A}}$ is 3.0 units in length and points along the positive *x* axis; vector $\vec{\mathbf{B}}$ is 5.0 units in length and points along a direction 150° from the positive *x* axis. What is the magnitude of the resulting vector when vectors $\vec{\mathbf{A}}$ and $\vec{\mathbf{B}}$ are added?

a. 7.0
b. 6.7
c. 2.8
d. 2.1

ANSWER: c

91. Vector $\vec{\mathbf{A}}$ is 3.00 units in length and points along the positive *x* axis; vector $\vec{\mathbf{B}}$ is 5.00 units in length and points along a direction 150° from the positive *x* axis. What is the direction of their sum with respect to the positive *x* axis?

a. 62.0°
b. 13.0°
c. 118°
d. 103°

ANSWER: c

92. I walk six miles in a straight line in a direction north of east, and I end up four miles north and several miles east. How many degrees north of east have I walked?

a. 19°
b. 42°
c. 60°
d. 71°

ANSWER: b

93. Note the expression: $y = x^2$. Which statement is most consistent with this expression?

a. If *y* doubles, then *x* quadruples.
b. *y* is greater than *x*.
c. If *x* doubles, then *y* doubles.
d. If *x* doubles, then *y* quadruples.

ANSWER: d

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Chapter 01

94. Note the expression: $y = A/x^3$. Which statement is most consistent with this expression?

a. y is less than A.

b. If x is halved, y is multiplied by eight.

c. If x is doubled, y is multiplied by a factor of 8.

d. y is greater than x.

ANSWER: b

95. A circle has an area of 3.0 m^2. A second circle has double the radius of the first. The area of the second circle is ____ times that of the first.

a. 0.8

b. 2.0

c. 4.0

d. 6.0

ANSWER: c

96. Doubling the radius of a sphere results in increasing its volume by a factor of

a. 2.

b. 4.

c. 8.

d. 8π.

ANSWER: c

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