

1. A pint of water (on Earth) is approximately
 - A) 1 pound.
 - B) 1 gram.
 - C) 1 kilogram.
 - D) 1 quart.

2. Historically, which measurement may have been defined as the distance from the royal nose to the thumb of the royal outstretched arm?
 - A) 1 foot
 - B) 1 yard
 - C) 1 meter
 - D) 1 kilometer

3. In a debate, is the statement "It's only a theory" a valid argument point against a theory (as in "The theory of evolution is wrong because it's only a theory")?
 - A) Yes, theories are weak.
 - B) No, theories are strong.
 - C) No, theories are weak.
 - D) Yes, theories are meaningless.

4. Which of the following is *not* considered a major physical science:
 - A) Physics
 - B) Astronomy
 - C) Geology
 - D) Biology
 - E) Meteorology

5. The word *science* comes from the Latin word meaning
 - A) "experiment."
 - B) "investigate."
 - C) "knowledge."
 - D) "debate."

6. The most information about our environment comes to us through the sense of
 - A) smell.
 - B) sight.
 - C) hearing.
 - D) touch.

7. Our senses may obtain less-than-accurate information concerning our physical world because they
- A) have limited sensitivity.
 - B) have a limited range.
 - C) are useless.
 - D) can be deceived.
8. A quantitative observation that is the basis of scientific investigation is a(n)
- A) experiment.
 - B) measurement.
 - C) explanation.
 - D) number.
9. A scientific law describes
- A) the scientific method.
 - B) a fundamental relationship of nature.
 - C) the behavior of nature.
 - D) an experiment.
10. A very tentative explanation of observations of some regularity of nature is a(n)
- A) scientific law.
 - B) theory.
 - C) experiment.
 - D) hypothesis.
11. A successfully tested hypothesis may take on the status of a(n)
- A) experimental result.
 - B) theory.
 - C) scientific law.
 - D) concept.
 - E) superior hypothesis.
12. A standard unit
- A) is the same in all systems of units.
 - B) may not be fixed in value.
 - C) is found only in the British system.
 - D) is used for taking accurate measurements.
 - E) is found only in the metric system.

13. The standard unit of time is the
A) hour.
B) day.
C) second.
D) minute.
14. Which of the following is *not* a fundamental quantity?
A) Weight
B) Length
C) Time
D) Mass
15. Which fundamental quantity does the average person measure most often every day?
A) Mass
B) Length
C) Time
D) Electric charge
16. Which has a larger mass, a liter of water or a liter of mercury (a liquid metal)?
A) mercury
B) water
C) none of these
17. Which has a larger volume, a liter of water or a liter of mercury (a liquid metal)?
A) water
B) mercury
C) none of these
18. The mass of a cubic meter of water is
A) 1 metric ton.
B) 100 kg.
C) 100 L.
D) 1 lb.
19. Which statement is *incorrect*?
A) A kilogram has an equivalent weight greater than that of a pound.
B) A kilometer is longer than a mile.
C) A meter is longer than a yard.
D) A liter is larger than a quart.

20. Which has more volume, a liter or a quart?
- A) A liter
 - B) A quart
 - C) Both are the same
 - D) Neither describes volume
21. Which of the following is *not* a standard metric unit?
- A) Kilogram
 - B) Meter
 - C) Second
 - D) Gram
22. The standard unit of mass in the mks system is the
- A) meter
 - B) kilogram
 - C) pound
 - D) second
 - E) gram
23. The standard unit of time in the mks system is the
- A) meter
 - B) kilogram
 - C) second
 - D) minute
 - E) microsecond
24. The standard unit of distance in the mks system is the
- A) centimeter
 - B) inch
 - C) kilometer
 - D) meter
 - E) second
25. The standard unit of length, the meter, is now defined with reference to
- A) a meridian on the Earth.
 - B) the French metre.
 - C) the speed of light.
 - D) a platinum-iridium bar.
 - E) a member of the royal family.

26. The standard unit of time, the second, is now defined with reference to
- A) the Earth's revolution period.
 - B) the mean solar day.
 - C) the cesium-133 atom.
 - D) the Earth's rotation period.
27. The current definition of a kilogram is the mass of a platinum-iridium cylinder kept in
- A) the United States.
 - B) France.
 - C) England.
 - D) Japan.
28. In what year did the United States officially adopt the metric system?
- A) 1893
 - B) 1995
 - C) 2011
 - D) 1776
 - E) none of these
29. The meter was defined originally as
- A) one ten-millionth of the diameter of Earth.
 - B) one ten-millionth of the distance from the equator to the North Pole.
 - C) the wavelength of a line in the spectrum of krypton-86.
 - D) the length of a platinum-iridium bar.
30. The meter is presently defined as
- A) one ten-millionth of the diameter of Earth.
 - B) the wavelength of a line in the spectrum of krypton-86.
 - C) the length of a platinum-iridium bar.
 - D) the distance light travels in a vacuum in a very short time.
31. The metric prefix that means one-hundredth ($1/100$) is
- A) kilo-.
 - B) centi-.
 - C) mega-.
 - D) milli-.

32. The metric prefix that means one-thousandth ($1/1000$) is
- A) kilo-.
 - B) centi-.
 - C) milli-.
 - D) nano-.
33. The metric prefix that means one thousand (1000) is
- A) kilo-.
 - B) centi-.
 - C) mega-.
 - D) milli-.
34. The metric prefix that means one million (1,000,000) is
- A) centi-.
 - B) mega-.
 - C) milli-.
 - D) nano-.
35. The metric prefix that means ten (10) is
- A) deci
 - B) deka
 - C) milli
 - D) centi
 - E) kilo
36. The metric prefix that means one tenth ($1/10$) is ...
- A) deka
 - B) deci
 - C) centi
 - D) milli
 - E) none of these
37. A cubic centimeter of pure water at maximum density has a mass of
- A) 1 g.
 - B) 1 kg.
 - C) 1 cg.
 - D) 1 lb.
 - E) none of these

38. In the SI, m is the symbol for
- A) mass.
 - B) meter.
 - C) mole.
 - D) metric.
39. Which of the following is a unit of mass density?
- A) kg/m^3
 - B) g/cm^2
 - C) lb/ft^3
 - D) lb/ft^2
40. One kilogram is the same as
- A) 1000 g.
 - B) 1/1000 kg.
 - C) 10,000 g.
 - D) 0.001 g.
41. An object's weight would be different on Earth and on the Moon. Which of the following would also be different?
- A) Mass density
 - B) Mass
 - C) Length
 - D) Volume
 - E) None of these
42. An object transported from Earth's surface to the surface of the Moon has
- A) the same mass, but different weight.
 - B) the same weight, but different mass.
 - C) the same mass and the same weight.
 - D) different mass and different weight.
 - E) none of these.
43. In buying a product, a shopper has a choice of the following amounts, all at the same price. Which is the best buy?
- A) 432 cc
 - B) 1 pint
 - C) 1 half-liter
 - D) 450 mL

44. A hydrometer is used to measure
- A) the time for an object to sink.
 - B) water (hydro).
 - C) the volume of a quantity of water.
 - D) liquid density.
45. Which of the following is *not* a derived quantity?
- A) Volume
 - B) Speed
 - C) Mass
 - D) Density
46. The International System of Units (SI) has _____ base units.
- A) four
 - B) six
 - C) seven
 - D) five
47. What is the mass of 25 cm^3 of pure water?
- A) None of these
 - B) 25 kg
 - C) 25 g
 - D) 25 mL
48. A derived unit
- A) involves only length.
 - B) is a combination of units.
 - C) applies only to density.
 - D) is not found in the metric system.
49. A metric ton (or tonne) is
- A) the same as a British ton.
 - B) not defined.
 - C) a mass unit.
 - D) a weight unit.

50. Which of the following quantities expressed in derived units includes the unit of length?
- A) Area
 - B) Volume
 - C) Speed
 - D) Density
 - E) All of these
51. Density describes
- A) mass per unit volume.
 - B) length per unit time.
 - C) volume per liter.
 - D) weight per mass.
52. A relationship such as $1 \text{ in.} = 2.54 \text{ cm}$ is a(n)
- A) equivalence statement.
 - B) base unit.
 - C) derived unit.
 - D) fundamental quantity.
53. A method of expressing the accuracy of measured quantities is
- A) metric prefixes.
 - B) derived units.
 - C) significant figures.
 - D) conversion factors.
54. When multiplying and/or dividing quantities, you should report
- A) the result rounded to the same number of digits as there are in the quantity with the greatest number of significant figures.
 - B) all the digits that show on your calculator.
 - C) only whole numbers.
 - D) the result rounded to the same number of digits as there are in the quantity with the least number of significant figures.
55. Rounding the number 200.601 to three significant figures
- A) gives 199.
 - B) gives 200.
 - C) gives 200.601
 - D) gives 201.
 - E) cannot be done.

56. Expressed in standard powers-of-10 notation and rounded to four significant figures, the number 0.00023648 is
- A) 2.364×10^3 .
 - B) 2.365×10^4 .
 - C) 2.365×10^{-4} .
 - D) 236.4×10^{-6} .
57. One microgram (μg) contains how many grams?
- A) 10^{-3}
 - B) 10^{-6}
 - C) 10^{-9}
 - D) 10^3
58. One megawatt contains how many watts?
- A) 10^3
 - B) 10^{-6}
 - C) 10^6
 - D) 10^{-3}
59. The speed of light in a vacuum is 300,000,000 m/s. Represented in powers-of-10 notation, this is
- A) $30 \times 10^8 \text{m/s}$.
 - B) $3 \times 10^7 \text{m/s}$.
 - C) $30 \times 10^6 \text{m/s}$.
 - D) $3 \times 10^8 \text{m/s}$.
60. A measurement of 0.00254 g is the same as
- A) 0.254 mg.
 - B) 25.4 mg.
 - C) 254 mg.
 - D) 2.54 mg.
 - E) none of these.
61. For the multiplication of 7.443 m times 8.00 m, the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven

62. For the multiplication of 8.481 m times 7.7 m , the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven
63. For the multiplication of 8.1 m times 6.4 m , the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven
64. For the multiplication of 8.936 m divided by 1.90 m , the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven
65. For the multiplication of 3.799 m divided by 4.9 m , the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven
66. For the multiplication of 6.8 m divided by 8.6 m , the result should be reported with how many significant figures?
- A) Two
 - B) One
 - C) Three
 - D) Four
 - E) Seven

67. When the measured quantity 45.67 kg is divided by the measured quantity 3.42 L, the answer should have how many significant figures?
A) Three
B) One
C) Four
D) Two
68. The natural sciences are divided into _____ sciences and biological sciences.
69. The natural sciences are divided into physical sciences and _____ sciences.
70. A scientific law is a concise statement that describes a(n) _____ of nature.
71. The scientific method holds that no theory is valid unless its predictions are in accord with _____.
72. A hypothesis is a very tentative explanation of some _____ of nature.
73. A(n) _____ is a tested explanation of a broad segment of basic natural phenomena.
74. A proposed concept or model of nature is tested using the _____.
75. The three fundamental quantities studied in Chapter 1 are length, mass, and _____.
76. The measurement of space in any direction is called _____.
77. _____ is the continuous forward flow of events.
78. _____ is a measurement of the quantity of matter.

79. An object's _____ would be the same on Earth and on the Moon, but its weight would be different.
80. An object's mass would be the same on Earth and on the Moon, but its _____ would be different.
81. In the metric mks system of units, the letter k stands for _____.
82. In the metric mks system of units, the letter m stands for _____.
83. In the metric mks system of units, the letter s stands for _____.
84. Time is sometimes thought of as a fourth dimension of _____.
85. SI stands for the _____ of units.
86. On a computer, a megabyte of memory is _____ bytes.
87. The meter is defined in terms of the speed of _____.
88. A metric ton is _____ kg.
89. There are 10 mm in a(n) _____.
90. In the metric system, a penny might be called a(n) _____ dollar.
91. The metric system is a(n) _____ system.
92. The British system is a(n) _____, or base-12 system.

93. Given that $1 \text{ L} = 0.266 \text{ gal}$, the conversion factor for converting gallons to liters would be _____.
94. The ratio of mass to volume is known as _____.
95. Liquid density may be measured with a(n) _____.
96. The standard unit of mass in the SI is the _____.
97. One liter of pure water at its maximum density has a mass of 1 _____.
98. The unit of density in the mks system is _____.
99. A set value for a fundamental quantity is called a(n) _____ unit.
100. A combination of one or more fundamental units is called a(n) _____ unit.
101. A(n) _____ is a comparison of an unknown physical quantity with the standard unit.
102. A liter has a volume of _____ cubic centimeters.
103. Which is longer, a meter or a yard?
104. Which is larger, a liter or a quart?
105. In ratio form, the equivalence statement $1 \text{ mi} = 1.61 \text{ km}$ would be expressed as _____.
106. For the multiplication of $8.704 \text{ m} \times 3.14 \text{ m}$, the result should be reported with _____ significant figures.

107. If the decimal point is shifted to the left in a number expressed in powers-of-10 notation, the exponent, or power of 10, is _____.
108. If the decimal point is shifted to the right in a number expressed in powers-of-10 notation, the exponent, or power of 10, is _____.
109. A student's height is 180 cm. Determine that student's height in inches.
110. A friend from Europe asks what the length of a 100-yd football field would be in meters. After doing the conversion, what would you tell her?
111. How long is a 10.0-ft pole in meters?
112. A cubic container 40 cm on a side is filled with water. What is the mass of the water?
113. Dry air has a density of 1.29 kg/m^3 . What would be the volume of a metric ton of air?
114. Perform the operation of $157.98/0.498$, and report the result with the proper number of significant figures in standard powers-of-10 notation.
115. Express 100 megadollars in standard powers-of-10 notation.
116. Calculate the product of 3.0×10^7 and 1.6×10^9 . Express the answer in standard powers-of-10 notation.
117. Calculate the approximate number of seconds that a(n) 28-year-old student has lived.
118. If there are 2.54 cm/in., how many inches are there per centimeter?
119. Write 0.000000846 in standard powers-of-10 notation.
120. What does 4×10^{-12} times 3×10^{-8} divided by 2×10^{24} equal?

121. What does 6×10^{12} times 3×10^{-9} divided by 2×10^{-17} equal?

Answer Key

1. A
2. B
3. B
4. D
5. C
6. B
7. D
8. B
9. B
10. D
11. B
12. D
13. C
14. A
15. C
16. A
17. C
18. A
19. B
20. A
21. D
22. B
23. C
24. D
25. C
26. C
27. B
28. A
29. B
30. D
31. B
32. C
33. A
34. B
35. B
36. B
37. A
38. B
39. A
40. A
41. E
42. A
43. C
44. D

- 45. C
- 46. C
- 47. C
- 48. B
- 49. C
- 50. E
- 51. A
- 52. A
- 53. C
- 54. D
- 55. D
- 56. C
- 57. B
- 58. C
- 59. D
- 60. D
- 61. C
- 62. A
- 63. A
- 64. C
- 65. A
- 66. A
- 67. A
- 68. physical
- 69. biological
- 70. relationship (or regularity)
- 71. experiment
- 72. regularity (or relationship)
- 73. theory
- 74. scientific method
- 75. time
- 76. length
- 77. Time
- 78. Mass
- 79. mass
- 80. weight
- 81. kilogram
- 82. meter
- 83. second
- 84. space
- 85. International System
- 86. one million (10^6)
- 87. light
- 88. 1000
- 89. centimeter
- 90. centi-

91. decimal, or base-10
92. duodecimal
93. 0.266 gal/L
94. density
95. hydrometer
96. kilogram
97. kg
98. kg/m^3
99. standard
100. derived
101. measurement
102. 1000
103. A meter
104. A liter
105. 1.61 km/mi (or 1 mi/1.61 km)
106. three
107. increased
108. decreased
109. 70.9 in.
110. 91.4 m
111. 3.05 m
112. 64 kg
113. 775 m^3
114. 3.17×10^2
115. 1.0×10^8 dollars
116. 4.8×10^{16}
117. $8.8 \times 10^8 \text{ s}$
118. $1/2.54 = 0.394$
119. 8.46×10^{-7}
120. 6×10^{-44}
121. 9×10^{20}