56. Carry out the following computations, and express the result in scientific notation.
   a. 7.20×10^3 cm $\times$ 8.08×10^3 cm
   b. 3.7×10^4 mm $\times$ 6.6×10^4 mm $\times$ 9.89×10^3 mm
   c. 8.27×10^2 m $\times$ 2.5×10^{-3} m $\times$ 3.00×10^{-4} m
   d. 4.44×10^{-35} m $\times$ 5.55×10^{19} m $\times$ 7.69×10^{-12} kg
   e. 6.55×10^4 dm $\times$ 7.89×10^9 dm $\times$ 4.01893×10^5 dm

57. Carry out the following computations, and express the result in scientific notation.
   a. 2.290×10^7 cm $\div$ 4.33×10^3 s
   b. 1.788×10^{-5} L $\div$ 7.111×10^{-3} m^2
   c. 5.515×10^4 L $\div$ 6.04×10^3 km
   d. 3.29×10^{-4} km $\div$ 1.48×10^{-2} min
   e. 4.73×10^{-4} g $\div$ (2.08×10^{-3} km $\times$ 5.60×10^{-4} km)

Mixed Review

58. Express the following quantities in scientific notation.
   a. 158 000 km
   b. 0.000 009 782 L
   c. 837 100 000 cm^3
   d. 6 500 000 000 mm^2
   e. 0.005 93 g
   f. 0.000 000 006 13 m
   g. 12 552 000 J
   h. 0.000 008 004 g/L
   i. 0.010 995 kg
   j. 1 050 000 000 Hz

59. Perform the following calculations, and express the result in scientific notation with the correct number of significant figures.
   a. 2.48×10^2 kg + 9.17×10^3 kg + 7.2×10^1 kg
   b. 4.07×10^{-5} mg + 3.966×10^{-4} mg + 7.1×10^{-2} mg
   c. 1.39×10^4 m^3 + 6.52×10^2 m^3 − 4.8×10^3 m^3
   d. 7.70×10^{-9} m − 3.95×10^{-8} m + 1.88×10^{-7} m
   e. 1.111×10^5 J + 5.82×10^4 J + 3.01×10^6 J
   f. 9.81×10^{27} molecules + 3.18×10^{25} molecules − 2.09×10^{26} molecules
   g. 1.36×10^7 cm + 3.456×10^6 cm − 1.01×10^7 cm + 5.122×10^5 cm

60. Perform the following computations, and express the result in scientific notation with the correct number of significant figures.
   a. 1.54×10^{-1} L $\div$ 2.36×10^{-4} s
   b. 3.890×10^4 mm $\times$ 4.71×10^2 mm^2
   c. 9.571×10^3 kg $\div$ 3.82×10^{-1} m^2
   d. 8.33×10^3 km $\div$ 1.97×10^2 s
   e. 9.36×10^2 m $\times$ 3.82×10^3 m $\times$ 9.01×10^{-1} m
   f. 6.377×10^4 J $\div$ 7.35×10^{-3} s

61. Your electric company charges you for the electric energy you use, measured in kilowatt-hours (kWh). One kWh is equivalent to 3 600 000 J. Express this quantity in scientific notation.

62. The pressure in the deepest part of the ocean is 11 200 000 Pa. Express this pressure in scientific notation.

63. Convert 1.5 km to millimeters, and express the result in scientific notation.

64. Light travels at a speed of about 300 000 km/s.
   a. Express this value in scientific notation.
   b. Convert this value to meters per hour.
   c. What distance in centimeters does light travel in 1 μs?

65. There are 7.11×10^{24} molecules in 100.0 cm^3 of a certain substance.
   a. What is the number of molecules in 1.09 cm^3 of the substance?
   b. What would be the number of molecules in 2.24×10^4 cm^3 of the substance?
   c. What number of molecules are in 9.01×10^{-6} cm^3 of the substance?

66. The number of transistors on a particular integrated circuit is 3 578 000, and the integrated circuit measures 9.5 mm $\times$ 8.2 mm.
   a. What is the area occupied by each transistor?
   b. Using your answer from (a), how many transistors could be formed on a silicon sheet that measures 353 mm $\times$ 265 mm?

67. A solution has 0.0501 g of a substance in 1.00 L. Express this concentration in grams per microliter.

68. Cesium atoms are the largest of the naturally occurring elements. They have a diameter of 5.30×10^{-10} m. Calculate the number of cesium atoms that would have to be lined up to give a row of cesium atoms 2.54 cm (1 in.) long.

69. The neutron has a volume of approximately 1.4×10^{-44} m^3 and a mass of 1.675×10^{-24} g. Calculate the density of the neutron in g/m^3. What is the mass of 1.0 cm^3 of neutrons in kilograms?

70. The pits in a compact disc are some of the smallest things ever mass-produced mechanically by humans. These pits represent the 1s and 0s of digital information on a compact disc. These pits are only 1.6×10^{-8} m deep (1/4 the wavelength of red laser light). How many of these pits would have to be stacked on top of each other to make a hole 0.305 m deep?

71. 22 400 mL of oxygen gas contains 6.022×10^{23} oxygen molecules at 0°C and standard atmospheric pressure.
   a. How many oxygen molecules are in 0.100 mL of gas?
   b. How many oxygen molecules are in 1.00 L of gas?
   c. What is the average space in milliliters occupied by one oxygen molecule?

72. The mass of the atmosphere is calculated to be 5.136×10^{18} kg, and there are 6 500 000 000 people living on Earth. Calculate the following values.
   a. The mass of atmosphere in kilograms per person.
   b. The mass of atmosphere in metric tons per person.
   c. If the number of people increases to 9 500 000 000, what is the mass in kilograms per person?

73. The mass of the sun is 1.989×10^{30} kg, and the mass of Earth is 5.974×10^{24} kilograms. How many Earths would be needed to equal the mass of the sun?

74. A new landfill has dimensions of 2.3 km $\times$ 1.4 km $\times$ 0.15 km.