Chapter 1 Homework Key

1.50 How many significant figures does each number contain?

		SF
a.	16.00	4
b.	160	2
c.	0.00160	3
d.	1,600,000	2
e.	1.06	3
f.	0.1600	4
g.	1.060×10^{10}	4
h.	1.6×10^{-6}	2

1.54 Carry out each calculation and report the answer using the proper number of significant figures.

a. $49,682 \times 0.80 = 39745.6 = \boxed{4.0 \times 10^4}$

b.
$$\begin{array}{r} 66.815 \\ +\ 2.82 \\ \hline 69.635 \end{array} = \boxed{69.64}$$

c. $1,000 \div 2.34 = 427.35042735 = \boxed{4 \times 10^2}$

d.
$$\begin{array}{r} 21 \\ -\ 0.88 \\ \hline 20.12 \end{array} = \boxed{2.0 \times 10^1}$$

e. $25,000 \div 0.4356 = 57392.1028466 = \boxed{5.7 \times 10^4}$

f.
$$\begin{array}{r} 21.5381 \\ +\ 26.55 \\ \hline 48.0881 \end{array} = \boxed{48.09}$$

1.68 Carry out each of the following conversions

a. What is the mass in pounds of an individual who weighs 53.2 kg?

Road Map: kg $\xrightarrow{\text{def}}$ g $\longrightarrow$ lbs

$$53.2\ \text{kg} \times \frac{1000\ \text{g}}{1\ \text{kg}} \times \frac{1\ \text{lbs}}{453.6\ \text{g}} = 117.2839506171\ \text{lbs}$$

(3 sig figs; 4 sig figs)

117 lbs

b. What is the height in inches of a child who is 90. cm tall?

Road map: cm $\longrightarrow$ in

$$90.\ \text{cm} \times \frac{1\ \text{in}}{2.54\ \text{cm}} = 35.43307086614\ \text{in}$$

(2 sig figs; def)

35 in

c. How many mL are contained in the 5.0 qt of blood in the human body?

Road map: qt $\xrightarrow{\text{def}}$ gal $\longrightarrow$ L $\xrightarrow{\text{def}}$ mL

$$5.0\ \text{qt} \times \frac{1\ \text{gal}}{4\ \text{qt}} \times \frac{3.785\ \text{L}}{1\ \text{gal}} \times \frac{1000\ \text{mL}}{1\ \text{L}} = 4731.25\ \text{mL}$$

(2 sig figs; 4 sig figs)

4.7×10^3 mL

d. A patient had a body temperature of 103.5°F. What is his body temperature in °C?

Eq $°C \times \frac{180}{100} + 32 = °F$ or $(°F - 32) \times \frac{100}{180} = °C$

$$(103.5 - 32) \times \frac{100}{180} = 39.722222\ldots\ °C$$

(4 sig figs)

39.72 °C

1.80 The density of Sucrose, table sugar, is 1.56 g/cc. What volume (in cubic centimeters) does 20.0 g of Sucrose occupy?

Road Map: g → cc

$$20.0\text{g} \times \frac{1\text{ cc}}{1.56\text{ g}} = 12.8205128205\text{ cc} = \boxed{12.8\text{ cc}}$$

1.84 If gasoline has a density of 0.66 g/mL, how many kilograms does 1 gal of gas weigh?

Road Map: gal → L → mL → g → kg

$$1\text{ gal} \times \frac{3.785\text{ L}}{1\text{ gal}} \times \frac{1000\text{ mL}}{1\text{ L}} \times \frac{0.66\text{ g}}{1\text{ mL}} \times \frac{1\text{ kg}}{1000\text{ g}} = 2.4981\text{ kg}$$

$$= \boxed{2\text{ kg}}$$

1.96 The recommended daily calcium intake for a woman over 50 years of age is 1,200 mg. If one cup of Milk has 306 mg of calcium, how many cups of Milk provide this amount of calcium?

Road Map: mg → Cup

$$1{,}200\text{ mg} \times \frac{1\text{ cup Milk}}{306\text{ mg}} = 3.92156862745\text{ cup} = \boxed{3.9\text{ cups}}$$

b. How many mL of Milk does this correspond to?

Road Map: mg → Cup → qts → gal → L → mL

$$1{,}200\text{ mg} \times \frac{1\text{ cup}}{306\text{ mg}} \times \frac{1\text{ qt}}{4\text{ cups}} \times \frac{1\text{ gal}}{4\text{ qts}} \times \frac{3.785\text{ L}}{1\text{ gal}} \times \frac{1000\text{ mL}}{1\text{ L}} = 927.9412$$

$$\boxed{9.3 \times 10^{2}\text{ mL}}$$

1.106 Often the specific amount of a drug to be administered must be calculated from a given dose in mg per kg body weight. This assures that individuals who have very different body mass get the proper dose. If the proper dosage of a drug is 2 mg/kg of body weight, how many mg would a 110-lb individual need?

Road Map: lbs → g → kg → mg

$$110\text{ lbs body} \times \frac{453.6\text{ g body}}{1\text{ lbs body}} \times \frac{1\text{ kg body}}{1000\text{ g body}} \times \frac{2\text{ mg medicine}}{1\text{ kg body}} =$$

$$\frac{99.792\text{ mg}}{1\times10^{2}\text{ mg medicine}}$$