24. a. exact b. inexact; 0.9144 m/yd is exact (see Exercise 1.23c)
Thus, there are 1/0.9144 = 1.093613... yd/m.

c. exact d. inexact (π has an infinite number of decimal places.)

26. a. 100; l S.F. b. $l.0 \times l0^2$; 2S.F. c. 1.00×10^3; 3 S.F. d. 100. ; 3 S.F .

e. 0.0048 ; 2 S.F. f. 0.00480 ; 3 S.F.

g. 4.80×10^{-3}; 3 S.F. h. 4.800×10^{-3}; 4 S.F .

28. a. 5×10^2 b. 4.8×10^2 c. 4.80×10^2 d. 4.800×10^2

30. For multiplication and/or division, the result has the same number of significant figures as the number in the calculation with the fewest significant figures.

a. $\frac{0.102 \times 0.0821 \times 273}{1.01} = 2.2635 = 2.26$

b. $0.14 \times 6.022 \times 10^{23} = 8.431 \times 10^{22} = 8.4 \times 10^{22}$;
Since 0.14 only has two significant figures, then the result should only have two significant figures

c. $4.0 \times 10^4 \times 5.021 \times 10^{-3} \times 7.34993 \times 10^2 = 1.476 \times 10^5 = 1.5 \times 10^5$

d. $\frac{2.00 \times 10^6}{3.00 \times 10^{-7}} = 6.6667 \times 10^{12} = 6.67 \times 10^{12}$

38. a. $908 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} \times \frac{0.4536 \text{ kg}}{1 \text{ lb}} = 25.7 \text{ kg}$

b. $12.8 \text{ L} \times \frac{1 \text{ qt}}{0.9463 \text{ L}} \times \frac{1 \text{ gal}}{4 \text{ qt}} = 3.38 \text{ gal}$

c. $125 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1 \text{ qt}}{0.9463 \text{ L}} = 0.132 \text{ qt}$

d. $2.89 \text{ gal} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{1 \text{ L}}{1.057 \text{ qt}} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 1.09 \times 10^4 \text{ mL}$

e. $4.48 \text{ lb} \times \frac{453.6 \text{ g}}{1 \text{ lb}} = 2.03 \times 10^3 \text{ g}$

f. $550 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1.06 \text{ qt}}{\text{L}} = 0.58 \text{ qt}$

48. $T_C = \frac{5}{9}(74 - 32) = 23°C$; $T_K = 23 + 273 = 296 \text{ K}$

54. $\text{mass} = 350 \text{ lb} \times \frac{453.6 \text{ g}}{1 \text{ lb}} = 1.6 \times 10^5 \text{ g}$; $V = 1.2 \times 10^4 \text{ in}^3 \times \left(\frac{2.54 \text{ cm}}{\text{in}}\right)^3 = 2.0 \times 10^5 \text{ cm}^3$

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{1.6 \times 10^5 \text{ g}}{2.0 \times 10^5 \text{ cm}^3} = 0.80 \text{ g/cm}^3$$

Since the material has a density less than water, then it will float in water.

62. a. 1.0 kg feather; Feathers are less dense than lead.

b. 100 g water since water is less dense than gold.

c. Same; Both volumes are 1.0 L.

64. Homogeneous: Having visibly indistinguishable parts (the same throughout).
Heterogeneous: Having visibly distinguishable parts (not uniform throughout).

a. heterogeneous (Due to mulch, water, roots, etc which can all be present.)

b. heterogeneous: There is usually a fair amount of particulate matter present in the atmosphere (dirt, smog) in addition to condensed water (rain, clouds). However, a clean atmosphere consisting of only clean air can be considered homogeneous.

c. heterogeneous (due to bubbles) d. homogeneous e. homogeneous f. homogeneous