Chapter 1 Answers to Problems

1. 2.5 m **2.** 3600/1 **3.** 7.7% **4.** 1.4 **5.** 6/*s* **6.** 1.10, 10% **7.** 10^{-8} **8.** down 0.25% **9.** 11.8 yr **10.** 56% **11.** 36.0% **12.** 3.60 **13.** (a) 1.29×10^{8} kg (b) 1.3×10^{8} m/s **14.** (a) 2.9×10^{8} people (b) 3.8×10^{-15} m **15.** (a) 3.63×10^{7} g (b) 1.273×10^{2} m **16.** (a) 6.88×10^{-5} m (b) 2600.00 km (c) 22 m^2 (d) 0.01 cm (e) 0.013 m **17.** 1.7×10^{-10} m^3 **18.** (a) 3 (b) 3 (c) 2 (d) 3 (e) 3 (f) 2 (g) 4 **19.** 459 m/s **20.** 3.28×10^{2} m **21.** 2.8×10^{-7} inches **22.** (a) 12.0 fluid ounces (b) 473 mL **23.** (a) 4.863×10^{2} m, 10^2 (b) 1.834×10^{3} m, 10^3 **24.** 0.278 m/s **25.** (a) 8.6 m/s (b) 19 mi/h **26.** 26.22 mi **27.** 0.12 or 12% **28.** 0.14 W/cm^2 **29.** 13.6 g/cm^3 **30.** 3.21 m **31.** 1.7×10^{-10} km^3 **32.** (a) 929 cm^2 (b) 1×10^{4} cm^2 (c) 11 **33.** (a) 2.7×10^{-3} ft/s (b) 1.9×10^{-3} mi/h **34.** 1.5×10^{-4} mm^2 **35.** kg·m^2·s^{-2} **36.** (a) $[M][L][T]^{-2}$ =$[M][L][T]^{-2}$ (b) $[M][L][T]^{-2}$ **37.** $[T]^2 = [T]^2$ **38.** kg·m·s^{-2} **39.** (a) $[L^3]$ (b) volume **40.** $v = \omega r$ **41.** 30-40 cm **42.** 2400 cm^3 **43.** (a) 10 kg (b) 10 m **44.** 3×10^{9} **45.** 400 shops, −16% **46.** 10^7 s **47.** 100 m **48.** *A* on the vertical axis and B^3 on the horizontal axis **49.** (a) 101.8°F (b) 0.9º F/h (c) no **50.** $x = (25\ m/s^4)t^4 + 3$ m **51.** 104.5°F **52.** (b) 1.4 lb/mo (c) 0.78 lb/mo (d) 210 lb **53.** (a) a (b) $+v_0$ **54.** (a) 12 m/s (b) 33 m/s **55.** (b) the graph is linear **56.** (a) 1.6 km/h, 3.0 km (b) speed, starting position **57.** (a) 186.303 (b) 186.297 (c) 0.56 (d) 62,000 (e) 0.0016%, 0.0016%, For case (c), ignoring 0.0030 causes you to multiply by zero and get a zero result. For case (d), ignoring 0.0030 causes you to divide by zero. (f) You can neglect small values when they are added to or subtracted from sufficiently large values. The term "sufficiently large" is determined by the number of significant figures required. **58.** 2.6 N **59.** 4.0 **60.** (a) 5.0×10^{-3} cm (b) 360,000 **61.** 434 m/s **62.** (a) 166 μm/s (b) 0.0144 km/day **63.** (a) three, 5.74×10^{-3} kg (b) one, 2 m, (c) three, 4.50×10^{-3} m (d) three, 4.50×10^{1} kg (e) four, 1.009×10^{5} s (f) four, 9.500×10^{3} mL **64.** (a) 2890 in^3 (b) 0.495 cubic cubits **65.** (a) 6 Mm (b) 2 m (c) 1 μm (d) 3 nm (e) 0.3 nm **66.** 10^4 viruses **67.** (a) 3.3×10^{-8} m (b) 3.3×10^{-2} μm (c) 1.3×10^{-6} in **68.** (a) 33.5 m (b) 4.2 bus lengths **69.** 2.2×10^{2} m^3 **70.** 6.0×10^{-6} m^3 **71.** (a) $a = Kv^2/r$, where *K* is a dimensionless constant (b) 21.0% **72.** ½, ½, $K\sqrt{(\lambda g)}$ **73.** 2.24 mi/h = 1 m/s, for a quick, approximate conversion, multiply by 2 **74.** 10^3 cups **75.** 10^{11} gallons **76.** (a) 100 kg (b) 50 kg **77.** kg·m/s^2 **78.** $2^{3/2}T_{\text{Venus}} \approx 2.8T_{\text{Venus}}$ **79.** $59,000,000,000 **80.** 10^5 hairs **81.** (a) 2.4×10^{5} km/h (b) 10 min **82.** 0.704 **83.** (a) $\sqrt{(hG/c^5)}$ (b) 1.3×10^{-43} s **84.** $T = C\sqrt{(L/g)}$, where *C* is a constant of proportionality **85.** 0.46 s^{-1} **86.** 10^{16} m^3 **87.** (b) about 100 g (c) 0.30 s^{-1}