Ch. 2 Review

1. $\%ERROR = \frac{|24.5°C - 31.2°C|}{31.2°C} \times 100 = 21.5\%$

2. $\%ERROR = \frac{|44.2 g/mol - 58.14 g/mol|}{58.14 g/mol} \times 100 = 24\%$

} Very Poor Accuracy in each experiment

3. 2 4. 3 5. 1 6. 4 = # of sig. figs.

7. 5.06×10^{-4} mL 8. 4.2×10^{10} pm 9. 0.00500 km 10. 820.0 m

11. $(0.00600\ m^3) \div (0.030\ s^2) = 0.20$ m/s

12. $(167.55\ g) - (87.3\ g) = 80.3$ g

13. $(50.75\ mL) + (155\ mL) = 206$ mL

14. $(5,200\ cm^2)(0.07\ cm^1) = 400\ cm^2$

15. $(12.5\ g^3) \div (6.0\ g/cm^{3\,2}) = 2.1\ cm^3$

16. $(370\ mg) + (1200\ mg) = 1600$ mg

17. $M = D \times V = (2.72\ g/cm^3)(24.9\ cm^3) = 67.7$ g

18. $V = \frac{m}{D} = \frac{38\ g}{0.017\ g/L} = 2200$ L

19. $M = D \times V$
$= (21.4\ g/cm^3)(0.750\ cm^3)$
$= 16.1$ g

20. $177\ mL \left| \frac{1\ L}{1000\ mL} \right. = 0.177$ L

21. $56\ m \left| \frac{100\ cm}{1\ m} \right. = 560$ cm

22. $0.093\ kg \left| \frac{1000\ g}{1\ kg} \right| \frac{1000\ mg}{1\ g} = 93{,}000$ mg

23. $54{,}400\ \mu m \left| \frac{1\ m}{1{,}000{,}000\ \mu m} \right| \frac{10\ dm}{1\ m} = 0.544$ dm

24. $1.5\ km \left| \frac{1000\ m}{1\ km} \right| \frac{100\ cm}{1\ m} \left| \frac{1\ in}{2.54\ cm} \right| \frac{1\ ft}{12\ in} \left| \frac{1\ step}{2.25\ ft} \right. = 2187$ steps so ~ 2200 steps

25. $5.50\ ft \left| \frac{12\ in}{1\ ft} \right| \frac{2.54\ cm}{1\ in} = 168$ cm tall

26. $1.0\ m^3 \left| \frac{(100\ cm)^3}{(1\ m)^3} \right| \frac{1\ mL}{1\ cm^3} \left| \frac{1\ can}{355\ mL} \right. = 2{,}800$ cans

27. $20.0\ oz \left| \frac{1\ qt}{32\ oz} \right| \frac{1\ L}{1.057\ qt} \left| \frac{1000\ mL}{1\ L} \right. = 591$ mL

28. $2.0\ ft \left| \frac{12\ in}{1\ ft} \right| \frac{2.54\ cm}{1\ in} \left| \frac{10\ mm}{1\ cm} \right| \frac{1\ ant}{4.0\ mm} = 152$ ants

29. $15 \frac{\text{servings}}{\text{people}} \left| \frac{28.0\ g}{1\ serving} \right| \frac{1\ box}{107\ g} = 4$ boxes

30. $1.0\ qt \left| \frac{1\ L}{1.057\ qt} \right| \frac{1000\ mL}{1\ L} \left| \frac{0.80\ g}{1\ mL} \right| \frac{1\ kg}{1000\ g} \left| \frac{2.2\ lbs}{1\ kg} \right. = 1.7$ lbs

Chapter 3 Extra Review Sheet Name _____

Write the number of significant figures in the blank.

1. 4 2304
2. 3 2340
3. 4 2.340
4. 4 0.02340
5. 4 2.603
6. 2 150000
7. 5 150010
8. 2 1.5×10^6
9. 3 2.40×10^{-3}
10. 4 9.760
11. 3 0.00340
12. 4 105600

Round the following numbers to 3 significant figures.

13. 1840000 1844863
14. 4.00 4
15. 0.00680 0.0067987
16. 6.86 6.8578
17. 2500 2503 or 2.50×10^3
18. 30400 30409

Answer to the following with the correct number of significant figures. Circle your answer

19. 6.35 + 41.487 = 47.84
20. 23.339 - 16.1 = 7.2
21. $6.8 \times 10^5 + 3.52 \times 10^5 = 1.0 \times 10^6$
22. $3.2 \times 10^{-3} - 7.9 \times 10^{-4} = 2.4 \times 10^{-3}$
23. 593 x 20 = 10,000
24. 3210 x 460 = 1500000
25. $\frac{56.987}{6.82} = 0.120$
25. $\frac{6.4646987 \times 10^4}{5.78 \times 10^{-8}} = 1.12 \times 10^{12}$

Using different rulers, Bruce and Pete each measure the length of the same object three times.

26. Bruce's three measurements are 19 cm, 20 cm, and 22 cm. Calculate the average value of his measurements and express the answer with the correct number of significant figures. $60 \div 3 = 20$ cm

27. Pete's three measurements are 20.9 cm, 21.0 cm, and 21.0 cm. Calculate the average value of his measurements and express the answer with the correct number of significant figures. $62.9 \div 3 = 21.0$ cm

28. Whose measurements are more precise? Pete's

29. The actual length of the object is 20.0 cm. Whose measurements are more accurate? Bruce's

30. What is the error of Pete's average measurement? 21.0 cm - 20.0cm = 1.0cm

31. What is the percent error of Pete's average measurement? $\frac{1.0\text{cm}}{20.0\text{cm}} \times 100 = 5\%$ ERROR

Complete the following tables

Quantity measured	Base unit	Symbol
Length	meter	m
Mass	gram	g
Volume	liter	L
Temperature	Kelvin	K
Metric Temp.	degree Celsius	°C
Energy	Joules	J
Heat	calories	cal

Prefix	Abbreviation	Meaning
milli	m	1/1000 (1000 times smaller)
kilo	k	1000 (1000 times larger)
centi	c	1/100 (100 times smaller)
micro	μ	1/1000000 (1,000,000 times smaller)
nano	n	1,000,000,000 times smaller
mega	M	1,000,000 times larger
pico	p	1,000,000,000,000 times smaller

Problems. Answer the following questions. Show your work, include the units, and use the correct number of significant figures.

32. A piece of metal has a mass of 46.7 g and a volume of 3.7 mL. What is its density?

$$D = \frac{M}{V} = \frac{46.7\text{ g}}{3.7\text{ mL}} =$$

33. 520 mL of gasoline has a mass of 473 g. What is its density?

$$D = \frac{M}{V} = \frac{473\text{ g}}{520\text{ mL}} =$$

34. What is the density of a block of wood with the following dimensions

Length	15.24 cm
Width	6.23 cm
Height	3.56 cm
Mass	253 g

$V = l \times w \times h$
$= 338\text{ cm}^3$

$D = \frac{M}{V} = \frac{253\text{ g}}{338\text{ cm}^3} = 0.749\text{ g/cm}^3$

35. The density of a piece of metal is determined by the water displacement method. The metal had a mass of 23.47 g. A graduated cylinder was filled with 27.3 mL of water and after the metal was added the volume was 33.7 mL. What is the density?

$V = 33.7\text{ mL} - 27.3\text{ mL} = 6.4\text{ mL}$

$D = \frac{m}{V} = \frac{23.47\text{ g}}{6.4\text{ mL}} = 3.7\text{ g/mL}$

36. A chemical reaction takes place at 20°C. What is this temperature in Kelvins?

$20^\circ\text{C} + 273 = 293\text{ K}$

37. A typical refrigerator keeps food at 277 K. What is this temperature in degrees Celsius?

$277\text{ K} - 273 = 4\text{ K}$

1 L = 1.057 qt
1 gram = 0.0353 oz
1 kg = 2.20 lbs
1 inch = 2.54 cm

38. How many mL are in 0.037 quarts?

$$0.037\text{ qt} \times \frac{1\text{ L}}{1.057\text{ qt}} \times \frac{1000\text{ mL}}{1\text{ L}} = 35\text{ mL}$$

39. How many micrograms are in 6.8×10^{-7} ounces?

$$6.8 \times 10^{-7}\text{ oz} \times \frac{1\text{ lb}}{16\text{ oz}} \times \frac{454\text{ g}}{1\text{ lb}} \times \frac{1 \times 10^6\,\mu\text{g}}{1\text{ g}} = 17\,\mu\text{g}$$

40. Calculate the length in km of a sign 25.0 inches long.

$$25.0\text{ in} \times \frac{1\text{ ft}}{12\text{ in}} \times \frac{1\text{ mi}}{5280\text{ ft}} \times \frac{1.61\text{ km}}{1\text{ mi}} = 6.35 \times 10^{-4}\text{ km}$$

41. Find the mass in grams of 327 mL liters of Al. The density of Al is 2.70 g/cm^3.

$$327\text{ mL} \times \frac{1\text{ cm}^3}{1\text{ mL}} \times \frac{2.70\text{ g}}{1\text{ cm}^3} = 883\text{ g Al}$$

42. Convert the density of Al to pounds/quart. The density of Al is 2.70 g/cm^3.

$$\frac{2.70\text{ g}}{1\text{ cm}^3} \times \frac{1\text{ lb}}{454\text{ g}} \times \frac{1\text{ cm}^3}{1\text{ mL}} \times \frac{1000\text{ mL}}{1\text{ L}} \times \frac{1\text{ L}}{1.057\text{ qt}} = 5.63\text{ lbs/qt}$$

43. A molecule is traveling at a speed of 420 meters per second. What is its speed in miles per hour?

$$\frac{420\text{ m}}{1\text{ s}} \times \frac{60\text{ s}}{1\text{ min}} \times \frac{60\text{ min}}{1\text{ hr}} \times \frac{1\text{ km}}{1000\text{ m}} = 1500\text{ km/hr}$$