Guidelines for Determining Significant Figures in Calculations

Name _____

	Rule	Sample Problems	# of Sig Figs Needed	Final Answers
1.	**Multiplication and Division** The product or quotient contains the same number of significant digits as the measurement with the least number of significant digits.	12.0 cm x 4.3 cm = 51.6 cm^2	2	52 cm^2
		24 cm x 31.8 cm = 763.2 cm^2	2	760 cm^2
		8.40 g ÷ 4.2 mL = 2 g/mL	2	2.0 g/mL
2.	**Conversion Factors** Exact conversion factors have no uncertainty and do not limit the number of digits in a calculation. .	2453 cm x $\frac{1\ m}{100\ cm}$ = 24.53 m	4	24.53 m
			# of Decimal Places Needed	
3.	**Addition and Subtraction** The sum or difference has the same number of decimal places as the measurement with the least number of decimal places.	49.1 g + 8.001 g = 57.101 g	1	57.1 g
		81.350 m - 7.35 m = 74 m	2	74.00 m

Complete all questions. Using the rules for significant figures.
Show work.

1. **Add. (rule # 3)**

a.
4.244 cm
66.15 cm
46.13 cm
5.65 cm
23.7 cm

b.
0.0897 m
8.912 m
3.78 m
9.12 m

c.
125.12713 L
3.573 L
53.4 L

d.
672.7 kg
3.2316 kg
48.7 kg
6.89 kg

e. $(1.28 \times 10^{23}\ cm) + (3.99 \times 10^{23}\ cm) =$ _____

f. $(5.14 \times 10^{7}\ mL) + (3.56 \times 10^{6}\ mL) =$ _____

2. **Subtract. (rule # 3)**

a.
669.62 m
2.724 m

b.
755.58 L
698.2 L

c.
408.329 g
0.0055 g

d.
0.5975 mg
0.05 mg

e. $(7.23 \times 10^{9}\ kL) - (1.66 \times 10^{9}\ kL) =$ _____

f. $(4.90 \times 10^{4}\ dm) - (3.865 \times 10^{3}\ dm) =$ _____

3. **Multiply.** **(rule # 1)**

a. $(3.3 \times 10^{-4}\ m) \times (0.1238\ m) =$ _____ b. $(801\ cm^2) \times (520\ 600\ cm) =$ _____

c. $(0.0195\ mm^2) \times (1300\ mm) =$ _____ d. $(894\ mm^2) \times (3.0 \times 10^{-3}\ mm) =$ _____

e. $(7.32 \times 10^{24}\ L) \times (6.78 \times 10^{15}\ L) =$ _____

4. **Divide.** **(rule # 1)**

a. $\frac{3.09 \times 10^{-3}\ hm^2}{7.05\ hm} =$ _____ b. $\frac{4.02 \times 10^{4}\ cm^3}{2.3 \times 10^{4}\ cm^2} =$ _____

c. $\frac{2.2 \times 10^{-4}\ mm^3}{5.001 \times 10^{4}\ mm} =$ _____ d. $\frac{4.29 \times 10^{5}\ mm^2}{2.66 \times 10^{3}\ mm} =$ _____

5. **Perform the following operations.**

a. $(1.29 \times 10^{2}\ mm) + (7.56 \times 10^{2}\ mm) =$ _____

b. $(4.59 \times 10^{6}\ cm) - (6.02 \times 10^{4}\ cm) =$ _____

c. $(5.4 \times 10^{6}\ kg) + (3.2 \times 10^{7}\ kg) =$ _____

d. $\frac{4.84 \times 10^{14}\ m^2}{2.42 \times 10^{7}\ m} =$ _____

e. $(4.86 \times 10^{2}\ mm)(5.24 \times 10^{2} mm) - (2.2 \times 10^{4} mm^2) =$ _____

f. 16 944 eggs convert to dozens of eggs = _____

ANSWERS: 1.a. 145.9 cm b. 21.90 m c. 182.1 L d. 731.5 kg e. 5.27×10^{23} cm f. 5.50×10^{7} mL
2.a. 666.90 m b. 57.4 mL c. 408.324 g d. 0.55 mg e. 5.57×10^{9} kL f. 4.51×10^{4} dm
3.a. $4.1 \times 10^{-5}\ m^2$ b. $4.17 \times 10^{8}\ cm^3$ c. $25\ mm^3$ d. $2.7\ mm^3$ e. $4.96 \times 10^{40}\ L^2$
4.a. 4.38×10^{-4} hm b. 1.7 cm c. $4.4 \times 10^{-9}\ mm^2$ d. 161 mm
5.a. 885 mm b. 4.53×10^{6} cm c. 3.7×10^{7} kg d. 2.00×10^{7} m e. $2.32 \times 10^{5}\ mm^2$ f. 1412.0 dozen