NAME _____

Chemistry II Worksheet
Significant Digits, Scientific Notation, and Density

INSTRUCTIONS: It's time to take stock of where we are now. Work these problems on your own, because no one will be able to help you at test time (which isn't that far off). Express your answers with the proper units and the proper number of significant digits.

PART ONE. How many significant digits are there in each of the following numbers?

a. 34.98 cm _____
b. 6.02 g _____
c. 42 students _____
d. 50.08 mm _____
e. 75.0 in. _____
f. 0.000000485 m _____
g. 9.3 kg _____
h. 26.3 mL _____
i. 104.20 cm^3 _____
j. 0.02 mg _____

PART TWO. Perform each of the following calculations. Express your answer with the proper number of significant digits.

a. 15.9994 + 12.01115 _____
b. 22.9898 + 35.453 _____
c. 40.08 + 32.064 _____
d. 95.00 – 75.00 _____
e. 312.86 – 22.0 _____
f. $7.51 \times 2.52 \times 0.62$ _____
g. (48.12)(2.95) _____
h. $58.30 \div 16.48$ _____
i. 29.945 / 82.06 _____
j. $\dfrac{307.15}{10.08}$ _____

PART THREE. Convert each of the following numbers to or from scientific notation. Remember: only *one* non-zero digit in front of the decimal point!

a. 5,030,000 _____
b. 0.00000047 _____
c. 15,000,000,000 _____
d. 1,620,000 _____
e. 0.0000000000282 _____
f. 3.80×10^{6} _____
g. 2.50×10^{2} _____
h. 5.40×10^{-5} _____
i. 3.6×10^{-3} _____
j. 5.245×10^{10} _____

[*more on back*]

PART FOUR. Perform the following calculations. Make sure your numbers have the proper number of significant digits and the proper units (even though you might not exactly understand what the units *mean*).

a. $18.36\ \text{g} / 14.20\ \text{cm}^3$ _____

b. $40.08\ \text{g/mol} + 32.064\ \text{g/mol} + 4(15.9994\ \text{g/mol})$ _____
(The "4" is a counted number; it does not involve significant digits.)

c. $2(39.0983\ \text{g/mol}) + 2(51.994\ \text{g/mol}) + 7(15.9994\ \text{g/mol})$ _____
(Likewise, the "2"s and the "7" are counted.)

d. $480.0\ \text{m} \div 24.00\ \text{sec}$ _____

e. $324.5\ \text{mi} / 5.5\ \text{hr}$ _____

f. $105.40\ ^\circ\text{C} - 23.20\ ^\circ\text{C}$ _____

g. $21.8\ ^\circ\text{C} + 204.2\ ^\circ\text{C}$ _____

h. $37.0\ \text{K} + 273.0\ \text{K}$ _____

i. $\dfrac{(142.28\ \text{g})}{(3.00\ \text{cm})(15.50\ \text{cm})(5.25\ \text{cm})}$ _____

j. $\left(\dfrac{15.00\ \text{g Al}}{1}\right)\left(\dfrac{1\ \text{mol Al}}{26.9815\ \text{g Al}}\right)\left(\dfrac{2\ \text{mol Al}_2\text{O}_3}{4\ \text{mol Al}}\right)\left(\dfrac{101.96\ \text{g Al}_2\text{O}_3}{1\ \text{mol Al}_2\text{O}_3}\right)$ _____
(The whole numbers – 1s, 2, and 4 – are counted.)