Worksheet- Significant Figures & Scientific Notation **KEY**

Name:________________________________________
Date:___________________________ Per:_________

1. Use the Rules for Significant Figures to determine the proper number of significant figures in the following:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. 2,330 | = 3 | 6. 900 | = 1 | 11. 306 | = 3 | 16. 0.0007 | = 1 |
| 2. 5.0030 | = 5 | 7. 330,000 | = 2 | 12. 489.00 | = 5 | 17. 220.06 | = 5 |
| 3 0.3330 | = 4 | 8. 0.032 | = 2 | 13. 100,000 | = 1 | 18. 201 | = 3 |
| 4. 73.0 | = 3 | 9. 1050.0 | = 5 | 14. 68.00 | = 4 | 19. 5,000 | = 1 |
| 5. 3.330 | = 4 | 10. 128.3 | = 4 | 15. 90 | = 1 | 20. 0.0100 | = 3 |

2. When you multiply or divide significant figures there are special rules you must follow when you decide how many figures you can report in a measurement. Compute the following and report the answer with the appropriate number of significant figures.

a. (2) 5.0 x 16.22 x 490 = $4.0 \times 10^4$

b. (2) 99.80 x 467 x 6.0 = $2.8 \times 10^5$ or 280,000

c. (2) $\frac{567.0}{2200}$ = $2.6 \times 10^{-1}$ or 0.26

d. (1) $\frac{8900.0}{100}$ = 90 or $9 \times 10^1$

e. (1) $\frac{(66.0)(3000)(20)}{(43)(660)}$ = 100 or $1 \times 10^2$

f. (3) $\frac{(2000.0)(40.0)}{10.0}$ = $8.00 \times 10^3$

3. Addition and subtraction of significant figures is a very different procedure than multiplication. Remember that you can only report *one* estimated digit for any significant figure. Compute the following and report the proper number of significant figures. (Recall that you cannot report MORE than one estimated digit!)

a. 5,086.004 + 689.0 = 5,775.0

b. 980 - 47.5 = 933 (=930)

c. 5,000 + 6,780.0 = 11,780 (=12,000)

d. 5.0079 - 2.01 = 3.00

e. 63 + 93 = 156

f. 0.06 + 2 = 2

g. 0.9 - 0.00005 = 0.9

h. 0.08990 + 52. = 52.

4. Scientific Notation is the scientist's shorthand for writing either very large or very small numbers. In scientific notation all numbers are expressed as a product of a number between 1 and 10 and a whole number power of 10. For example, 1,000 in scientific notation would be expressed as $1.000 \times 10^3$. Notice that the 1000 has been converted to a number between 1 and 10 and the exponent represents the number of places the decimal had to be moved to convert it to that number. When moving the decimal left, the exponent will be a positive number. When moving the decimal right, the exponent will be a negative number such as $0.640 = 6.40 \times 10^{-1}$. Notice that the number of *significant figures* has been retained in the conversion to scientific notation. Express the following in scientific notation:

a. 36.8 = $3.68 \times 10^1$

b. 0.0387 = $3.87 \times 10^{-2}$

c. 0.0002165 = $2.165 \times 10^{-4}$

d. 56,010,000 = $5.601 \times 10^7$

e. 890 = $8.9 \times 10^2$

f. 0.0045 = $4.5 \times 10^{-3}$

5. Express the following scientific notation as a whole number or decimal:

a. $9.14 \times 10^{-4}$ = 0.000914

b. $3.60 \times 10^4$ = 36,000

c. $4.66 \times 10^{-2}$ = 0.0466

d. $5.50 \times 10^3$ = 5,500

e. $8 \times 10^{-6}$ = 0.000008

f. $9.0 \times 10^5$ = 900,000