

Name key Date \_\_\_\_\_ Period \_\_\_\_\_

SIG FIGS ROCK! (and so does SCIENTIFIC NOTATION)

Rules for counting significant figures	Example	# of sig figs
Digits other than zero are ALWAYS significant.	37.5	3
All zeros between two sig figs are significant.	4006	4
Zeros at the end of a number WITHOUT a decimal point are NOT significant.	307,500	4
Zeros at the end of a number WITH a decimal point are significant.	85.600	5
Zeros used for spacing the decimal point are not significant.	0.00970	3

**Rule for determining significant figures when adding or subtracting**

The result has the same number of DECIMAL PLACES as the least precise measurement used in the calculation.

Example:  $4.77 + 1.0 + 234.0 + 12.0111 = 251.8$  round the answer at the 0.1 place because all the added values go to the 0.1 place

**Rule for determining significant figures when multiplying or dividing**

The result has the same number of significant figures as the measurement with the FEWEST NUMBER of significant figures.

Example:  $3.22 \times 0.094 = 0.30$  only 2 sig figs in the answer because 0.094 only has 2 sig figs

**Rules on Scientific Notation**

- Any value less than one should have a negative exponent. ( $0.0395 = 3.95 \times 10^{-2}$ )
- Any value of ten or more should have a positive exponent. ( $4402 = 4.402 \times 10^3$ )
- Values between 1 and 10 have an exponent of zero. ( $8.0 = 8.0 \times 10^0$ )
- When putting a number in scientific notation, use only the sig figs and put only one **non-zero** digit to the left of the decimal.

**Practice Problems**

A. Write the number of sig figs in each value below.

1. 4302 4    2. 1,030 3    3. 2,074,000 4    4. 0.00080 2  
 5. 0.00001 1    6. 367.50 5    7. 0.00320 3    8. 601,500.00 8  
 9. 1,570,050 6    10. 47,000 2    11. 0.1020 4    12. 2.0390 5

B. Round the following numbers to four sig figs.

1. 7.98369 7.984    2. 40,555 40,560  
 3. 32.348 32.35    4. 92,856 92,870  
 5. 0.83455 0.8346    6. 113,697 113,700  
 7. 101.009 101.0    8. 5,695,239 5,695,000  
 9. 353.55 353.6    10. 0.056718 0.05672

does not need the sig figs

C. Solve the following and write the answer with the correct number of sig figs in expanded form. Then, write the number using scientific notation.

- $8.01 + 4.7 + 56 = \underline{68.7} \quad \underline{6.87 \times 10^1}$
- $567.18 - 40.9 = \underline{526.3} \quad \underline{5.263 \times 10^2}$
- $78.000 + 4.900 + 24.1 = \underline{107.0} \quad \underline{107 \times 10^2}$
- $(7,020.1 - 3509) + 300.22 = \underline{3811.3} \quad \underline{3.8113 \times 10^3}$
- $(34.788 - 20.9) + (9.11 + 13) = \underline{36.0} \quad \underline{3.6 \times 10^1}$
- $7.11 \times 0.87 = \underline{6.2} \quad \underline{6.2 \times 10^0}$
- $12.0 \times 0.0500 \times 430 = \underline{260} \quad \underline{2.60 \times 10^2}$
- $95,050 \times 0.409 = \underline{38900} \quad \underline{3.89 \times 10^4}$
- $78.00 / 9.00 = \underline{8.67} \quad \underline{8.67 \times 10^0}$
- $110.0 / 55.0 = \underline{2.00} \quad \underline{2.00 \times 10^0}$
- $(732.3 \times 9,609.4) / 0.0020 = \underline{3500000000} \quad \underline{3.5 \times 10^9}$
- $(0.0040 \times 1.090) / (3,090 \times 99,200) = \underline{0.00000000000014} \quad \underline{1.4 \times 10^{-11}}$
- $45 / (909 \times 10) = \underline{0.005} \quad \underline{5 \times 10^{-3}}$
- $(10.0 + 4.11 + 0.012) / 84.9 = \underline{0.17} \quad \underline{1.7 \times 10^{-1}}$
- $(9,125.8 - 6.61) / (4.80 \times 10^4) = \underline{0.190} \quad \underline{1.90 \times 10^{-1}}$
- $(345 - 2.1) (3,001) (0.00465) = \underline{4800} \quad \underline{4.8 \times 10^3}$

D. Put the following numbers in scientific notation.

- 2,345  $\underline{2.345 \times 10^3}$
- 33,800  $\underline{3.38 \times 10^4}$
- 0.0000707  $\underline{7.07 \times 10^{-5}}$
- 0.004050  $\underline{4.050 \times 10^{-3}}$
- 65.40  $\underline{6.540 \times 10^1}$
- 0.0970  $\underline{9.70 \times 10^{-2}}$

E. Put the following numbers into expanded notation.

- $9.4 \times 10^6$   $\underline{9,400,000}$
- $1.500 \times 10^2$   $\underline{150.0}$
- $435.4 \times 10^{-5}$   $\underline{0.004354}$
- $3.10 \times 10^{-3}$   $\underline{0.00310}$
- $6.00 \times 10^{-6}$   $\underline{0.00000600}$
- $5.881 \times 10^5$   $\underline{588,100}$