SIGNIFICANT FIGURES

Name ____________________

A measurement can only be as accurate and precise as the instrument that produced it. A scientist must be able to express the accuracy of a number, not just its numerical value. We can determine the accuracy of a number by the number of significant figures it contains.

1) **All digits 1-9 inclusive are significant.**
   Example: 129 has 3 significant figures.
2) **Zeros between significant digits are always significant.**
   Example: 5,007 has 4 significant figures.
3) **Trailing zeros in a number are significant <u>only</u> if the number contains a decimal point.**
   Example: 100.0 has 4 significant figures.
   100 has 1 significant figure.
4) **Zeros in the beginning of a number whose only function is to place the decimal point are not significant.**
   Example: 0.0025 has 2 significant figures.
5) **Zeros following a decimal significant figure are significant.**
   Example: 0.000<u>470</u> has 3 significant figures.
   0.<u>47000</u> has 5 significant figures.

Determine the number of significant figures in the following numbers.

1. 0.02 __1__
2. 0.020 __2__
3. 501 __3__
4. 501.0 __4__
5. 5,000 __1__
6. 5,000. __4__
7. 6,051.00 __6__
8. 0.0005 __1__
9. 0.1020 __4__
10. 10,001 __5__

Determine the location of the last significant place value by placing a bar over the digit. (Example: 1.70$\bar{0}$)

1. 80$\bar{4}$0 ____________________
2. 0.030$\bar{0}$ ____________________
3. 699.5 ____________________
4. 2.00$\bar{0}$ x 10^2 ____________________
5. 0.9010$\bar{0}$ ____________________
6. 90,$\bar{1}$00 ____________________
7. 4.$\bar{7}$ x 10^{-8} ____________________
8. 10,800,00$\bar{0}$. ____________________
9. 3.0$\bar{1}$ x 10^{21} ____________________
10. 0.00041$\bar{0}$ ____________________

CALCULATIONS USING SIGNIFICANT FIGURES

Name ____________________

When multiplying and dividing, limit and round to the least number of significant figures in any of the factors.

Example 1: 23.0 cm x 432 cm x 19 cm = 188,784 cm^3
The answer is expressed as 190,000 cm^3 since 19 cm has only two significant figures.

When adding and subtracting, limit and round your answer to the least number of decimal places in any of the numbers that make up your answer.

Example 2: 123.25 mL + 46.0 mL + 86.257 mL = 255.507 mL
The answer is expressed as 255.5 mL since 46.0 mL has only one decimal place.

Perform the following operations expressing the answer in the correct number of significant figures.

1. 1.35 m x 2.467 m = 3.330 = $3.33 m^2$
2. 1,035 m^2 ÷ 42 m = 24.643 = 25 m
3. 12.01 mL + 35.2 mL + 6 mL = 53.21 = 53 mL
4. 55.46 g − 28.9 g = 26.56 = 26.6 mL
5. .021 cm x 3.2 cm x 100.1 cm = 6.7267 = $6.7 cm^3$
6. 0.15 cm + 1.15 cm + 2.051 cm = 3.351 = 3.35 cm
7. 150 L^3 ÷ 4 L = 37.5 = $40 L^2$
8. 505 kg − 450.25 kg = 54.75 = 55 kg
9. 1.252 mm x 0.115 mm x 0.012 mm = .00172770 = $.0017 mm^3$ OR $1.7 \times 10^{-3} mm^3$
10. 1.278 x 10^3 m^2 ÷ 1.4267 x 10^2 m = 8.957735 = 8.958