

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 only 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: 0.000470 has 3 significant figures.
0.47000 has 5 significant figures.

Determine the number of significant figures in the following numbers.

- | | |
|----------------|-------------------|
| 1. 0.02 _____ | 6. 5,000. _____ |
| 2. 0.020 _____ | 7. 6,051.00 _____ |
| 3. 501 _____ | 8. 0.0005 _____ |
| 4. 501.0 _____ | 9. 0.1020 _____ |
| 5. 5,000 _____ | 10. 10,001 _____ |

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

- | | |
|------------------------------|--------------------------------|
| 1. 8040 _____ | 6. 90,100 _____ |
| 2. 0.0300 _____ | 7. 4.7×10^{-8} _____ |
| 3. 699.5 _____ | 8. 10,800,000. _____ |
| 4. 2.000×10^2 _____ | 9. 3.01×10^{21} _____ |
| 5. 0.90100 _____ | 10. 0.000410 _____ |

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: $23.0 \text{ cm} \times 432 \text{ cm} \times 19 \text{ cm} = 188,784 \text{ cm}^3$
The answer is expressed as $190,000 \text{ cm}^3$ 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: $123.25 \text{ mL} + 46.0 \text{ mL} + 86.257 \text{ mL} = 255.507 \text{ mL}$
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.

- $1.35 \text{ m} \times 2.467 \text{ m} = \underline{\hspace{2cm}}$
- $1,035 \text{ m}^2 \div 42 \text{ m} = \underline{\hspace{2cm}}$
- $12.01 \text{ mL} + 35.2 \text{ mL} + 6 \text{ mL} = \underline{\hspace{2cm}}$
- $55.46 \text{ g} - 28.9 \text{ g} = \underline{\hspace{2cm}}$
- $.021 \text{ cm} \times 3.2 \text{ cm} \times 100.1 \text{ cm} = \underline{\hspace{2cm}}$
- $0.15 \text{ cm} + 1.15 \text{ cm} + 2.051 \text{ cm} = \underline{\hspace{2cm}}$
- $150 \text{ L}^3 \div 4 \text{ L} = \underline{\hspace{2cm}}$
- $505 \text{ kg} - 450.25 \text{ kg} = \underline{\hspace{2cm}}$
- $1.252 \text{ mm} \times 0.115 \text{ mm} \times 0.012 \text{ mm} = \underline{\hspace{2cm}}$
- $1.278 \times 10^3 \text{ m}^2 \div 1.4267 \times 10^2 \text{ m} = \underline{\hspace{2cm}}$