

### SIGNIFICANT FIGURES

Name \_\_\_\_\_

measurement can only be as accurate and precise as the instrument that produced it. Hence, it is important 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 which only function 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: 0.000420 has 3 significant figures.  
0.0000 has 5 significant figures.

Determine the number of significant figures in the following numbers:

1. 0.02 2
2. 0.020 3
3. 601 3
4. 601.0 4
5. 5.000 4
6. 5.00 3
7. 6.06100 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: 1.705)

1. 6960 \_\_\_\_\_
2. 0.0005 \_\_\_\_\_
3. 699.5 \_\_\_\_\_
4. 2.000 × 10<sup>2</sup> \_\_\_\_\_
5. 0.90100 \_\_\_\_\_
6. 90.100 \_\_\_\_\_
7. 4.7 × 10<sup>4</sup> \_\_\_\_\_
8. 10.800.000 \_\_\_\_\_
9. 3.01 × 10<sup>3</sup> \_\_\_\_\_
10. 0.000410 \_\_\_\_\_

### CALCULATIONS USING SIGNIFICANT FIGURES

Name \_\_\_\_\_

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

Example 1: 23.0 cm × 432 cm × 19 cm = 188,784 cm<sup>3</sup>  
The answer is expressed as 190,000 cm<sup>3</sup> since 19 cm has only two significant figures.

Example 2: 123.25 mL + 46.0 mL + 84.237 mL = 253.507 mL  
The answer is expressed as 255.5 mL since 46.0 mL has only one decimal place.

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

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

1. 1.35 m + 2.467 m = 3.33 m
2. 1.235 m<sup>2</sup> + 42 m = 25 m
3. 12.01 mL + 36.2 mL + 6 mL = 53 mL
4. 55.46 g - 28.9 g = 26.6 g
5. 291 cm × 3.2 cm × 100.1 cm = 6.7 cm<sup>3</sup>
6. 0.15 cm + 1.15 cm + 2.051 cm = 3.35 cm
7. 150 g + 41 = 400 g
8. 595 kg - 450.25 kg = 55 kg
9. 1.252 mm × 0.115 mm × 0.012 mm = 0.0017 mm<sup>3</sup>
10. 1.278 × 10<sup>3</sup> m<sup>2</sup> + 1.4267 × 10<sup>3</sup> m = 8.958 m

### Significant Figures

Useful Appendix B  
Significant Figures

1. Record the measurement in the table below according to the number of significant figures or the significant place checked, and if the appropriate box and in the box below the table the number of significant figures.

Measurement	Sig figs	No. significant	Sig figs				
			1	2	3	4	5
a. 20.00 m	/		/				
b. 1.56 mL	/		/				
c. 0.924 mm	/		/				
d. 50.0 g	/		/				
e. 1.001 km	/		/				
f. 6.00°C	/		/				
g. 22.00 kg	/		/				
h. 0.5000 g	/		/				

2. Determine the number of significant figures in each of the following measurements:

- a. 5.6 m \_\_\_\_\_ 2
- b. 1.04 mL \_\_\_\_\_ 4
- c. 15.600 \_\_\_\_\_ Infinite number
- d. 0.03 mol \_\_\_\_\_ 2
- e. 100.000 mm \_\_\_\_\_ 3
- f. 6.02 L \_\_\_\_\_ 3
- g. 0.175 Hz \_\_\_\_\_ 3
- h. 3.00000 g \_\_\_\_\_ 7
- i. 4.000 m \_\_\_\_\_ 4
- j. 0.008 Hz \_\_\_\_\_ 3
- k. 4.000 km \_\_\_\_\_ 2
- l. 7.00 kg \_\_\_\_\_ 3
- m. 7.00 m \_\_\_\_\_ 3
- n. 0.0021 m \_\_\_\_\_ 2
- o. 200.0 g \_\_\_\_\_ 5
- p. 90 km \_\_\_\_\_ 1
- q. 120 m \_\_\_\_\_ 3
- r. 0.0005 Hz \_\_\_\_\_ 3
- s. 30.0000 \_\_\_\_\_ Infinite number
- t. 0.000000 m \_\_\_\_\_ 4
- u. 0.000000 g \_\_\_\_\_ 5
- v. 0.000000 Hz \_\_\_\_\_ 3
- w. 0.000000 m \_\_\_\_\_ 3
- x. 4.01 × 10<sup>5</sup> \_\_\_\_\_ 3
- y. 60000 × 10<sup>9</sup> g \_\_\_\_\_ 1
- z. 1000 × 10<sup>6</sup> Hz \_\_\_\_\_ 4