# Significant Figures Worksheet

How many significant figures are in each of the following numbers?

1) 5.40 ____

2) 210 ____

3) 801.5 ____

4) 1,000 ____

5) 101.0100 ____

6) $1.2 \times 10^3$ ____

7) 0.00120 ____

8) 0.0102 ____

9) $9.010 \times 10^{-6}$ ____

10) 2,370.0 ____

11) Why are significant figures important when taking data in the laboratory?

12) Why are significant figures NOT important when solving problems in your math class?

13) Using two different instruments, I measured the length of my foot to be 27 centimeters and 27.00 centimeters. Explain the difference between these two measurements.

14) I can lift a 20 kilogram weight over my head ten times before I get tired. Write this measurement to the correct number of significant figures.



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## Pop Quiz

*Please answer each of the following questions on a separate sheet of paper.*

Convert the following numbers into scientific notation. (1 point each)

1) 623,000
2) 230
3) 0.0034
4) 12
5) 0.0000890

Convert the following numbers back into standard notation. (1 point each)

6) $4.5 \times 10^{-5}$
7) $2.98 \times 10^{3}$
8) $3.1 \times 10^{0}$
9) $6.33 \times 10^{-7}$
10) $1.1 \times 10^{2}$

## Pop Quiz

*How many significant figures are in each of the following numbers? (1 point each)*

1) 340 _____
2) 280,010 _____
3) 0.0023 _____
4) 102,000 _____
5) 102,020 _____
6) 0.00230 _____
7) 0.0023020 _____
8) 1,020.030 _____
9) $2.3 \times 10^{-3}$ _____
10) $2.3010 \times 10^{-6}$ _____

## Pop Quiz

*Write the answers to the following problems with the correct number of significant figures. (1 point each)*

1) 20 + 3.6 = _____
2) 9002 – 800 = _____
3) 0.0023 x 0.0121 = _____
4) 98 / 0.003 = _____
5) 0.00011 – 78.22 = _____
6) 45 + 6.871 = _____
7) 340 x 0.0005 = _____
8) 65.90 / 34.001 = _____
9) 4 – 4.6 – 10 = _____
10) (3 x 9.1) + (14.02 / 10) = _____

## Pop Quiz

*Write the answers to the following problems on a separate sheet of paper.*

1) How many grams are there in 23.4 kilograms? (3 points)
2) How many inches are there in 522 centimeters? *There are 2.54 centimeters in an inch.* (3 points)
3) How many millimeters are there in 0.0045 decimeters? (5 points)
4) How many inches are there in $4.2 \times 10^{-5}$ miles? *There are 36 inches in a yard and 1760 yards in a mile.* (5 points)
5) Convert $341^{0}$ C to Kelvins. (3 points)
6) Convert 881 centuries to days. *There are 1461 days in 4 years.* (6 points)

# 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 _____
2. 0.020 _____
3. 501 _____
4. 501.0 _____
5. 5,000 _____
6. 5,000. _____
7. 6,051.00 _____
8. 0.0005 _____
9. 0.1020 _____
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 _____
2. 0.0300 _____
3. 699.5 _____
4. $2.000 \times 10^2$ _____
5. 0.90100 _____
6. 90,100 _____
7. $4.7 \times 10^{-8}$ _____
8. 10,800,000. _____
9. $3.01 \times 10^{21}$ _____
10. 0.000410 _____


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# 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 = _____
2. 1,035 $m^2$ + 42 m = _____
3. 12.01 mL + 35.2 mL + 6 mL = _____
4. 55.46 g − 28.9 g = _____
5. .021 cm x 3.2 cm x 100.1 cm = _____
6. 0.15 cm + 1.15 cm + 2.051 cm = _____
7. 150 $L^3$ ÷ 4 L = _____
8. 505 kg − 450.25 kg = _____
9. 1.252 mm x 0.115 mm x 0.012 mm = _____
10. 1.278 x $10^3$ $m^2$ ÷ 1.4267 x $10^2$ m = _____


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# CALCULATIONS USING SIGNIFICANT FIGURES

Name _____

When multiplying numbers in scientific notation, multiply the first part of the number (mantissa) and add exponents.

**Example 1:** $(3.0 \times 10^2)(2.5 \times 10^6) =$

**Answer:** Multiply $3.0 \times 2.5 = 7.5$
Add $2 + 6 = 8$
$= 7.5 \times 10^8$

When dividing numbers in scientific notation, divide the first part of the number and subtract exponents.

**Example 2:** $\dfrac{9.0 \times 10^6}{4.5 \times 10^2}$

**Answer:** Divide 9.0 by 4.5 = 2.0
Subtract 2 from 6 = 4
$= 2.0 \times 10^4$

Perform the following calculations. Express all answers in scientific notation.

| | |
|---|---|
| 1. $(1.5 \times 10^3)(3.5 \times 10^5)$ | 6. $(4 \times 10^5) \div (1 \times 10^{-3})$ |
| 2. $(2.0 \times 10^8)(2.0 \times 10^6)$ | 7. $(7.6 \times 10^{-3})(8.2 \times 10^{-4})$ |
| 3. $(6.2 \times 10^6) \div (3.1 \times 10^2)$ | 8. $(8.5 \times 10^{-8}) \div (2.5 \times 10^{-3})$ |
| 4. $(5.0 \times 10^4) \div (2.5 \times 10^3)$ | 9. $(7.0 \times 10^{11})(7.0 \times 10^{-11})$ |
| 5. $(6.8 \times 10^7)(2.2 \times 10^{-5})$ | 10. $(1.3 \times 10^{-5}) \div (2.6 \times 10^{-9})$ |


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