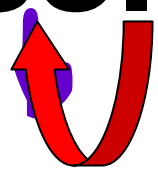
Significant Digits and Scientific Notation

Writing standard num…ific Notation

This is a number written in standard form.

To write this in scientific notation, the decimal must be moved to:

35.075

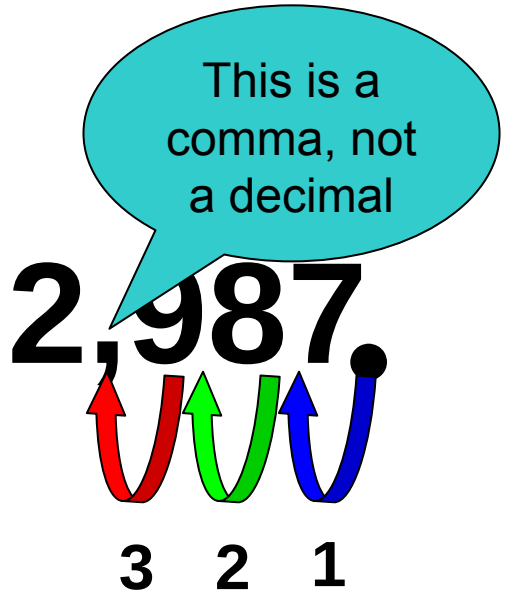


3.5075

Exponent is 1 since we moved the decimal 1 place.

Since you moved the decimal 1 place to the left, we write the number in scientific notation:

$$3.5075 \times 10^{1}$$



To write in scientific notation, add a decimal to the end of the number:

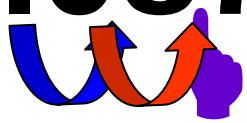
Move the decimal to the left:

Exponent is 3 because we moved the decimal 3 places

$$2.987 \times 10^{3}$$

To write a decimal number in scientific notation, the decimal needs to be moved to the right to:

0.0873



1 2

Move the decimal to the right:

008.73

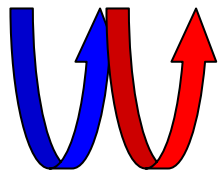
When you move the decimal to the right, the exponents are negative!

008.73×10^{-2}

Changing Scientific Notation to S

Since the exponent is 2, move the decimal 2 places to the right.

$$4.687 \times 10^2$$



1 2

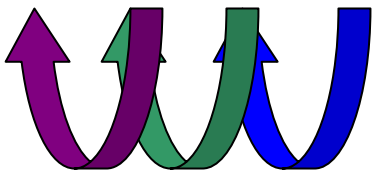
Drop the x 10^2 when writing in standard form.

468.7

Add 0's when needed to move the decimal.

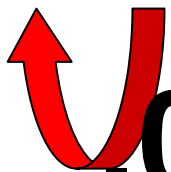
Since the exponent is negative, move the decimal to the left 4 spaces.

$.0\,0\,0\,6.87 \times 10^{-4}$



4 3 2 1

Drop the $\times 10^{-4}$



$.000687$

SIGNIFICANT DIGITS

- Significant digits or Significant figures are used by chemist in the lab around the world to show that certain measurements are accurate and precise.
- Your laboratory techniques will impact the significance of your digits/figures. (cylinder)
- Your laboratory equipment will also impact your digits. (electric balance)

SIGNIFICANT DIGITS

RULE #1

NONZERO numbers all are SIGNIFICANT

Example 1: 123 has THREE significant figures
Example 2: 45.777 has FIVE significant figures

How many are the following examples?
Example 3: 65.233
Example 4: 87,654,321

SIGNIFICANT DIGITS

RULE #2

All ZEROS between two NONZERO numbers are SIGNIFICANT

Example 1: 120056 has SIX significant figures
Example 2: 45.07 has FOUR significant figures

How many are the following examples?
Example 3: 60003
Example 4: 80.10101

SIGNIFICANT DIGITS

RULE #3

ZEROS in FRONT of NONZERO numbers are NOT SIGNIFICANT

Example 1: 0003 has ONE significant figures
Example 2: 00.0095 has TWO significant figures

How many are the following examples?
Example 3: 000000034
Example 4: 00.0017

SIGNIFICANT DIGITS

RULE #4

ZEROS at the end of a number are SIGNIFICANT if a decimal is PRESENT

Example 1: 12.300 has FIVE significant figures
Example 2: 45.00 has FOUR significant figures

How many are the following examples?
Example 3: 6554.00
Example 4: 00.0023400

SIGNIFICANT DIGITS

RULE #5

ZEROS at the end of a number are NOT SIGNIFICANT if a decimal is not present.

They are estimated digits and are considered insignificant.

Example 1: 13000 has TWO significant figures

Example 2: 45173000 has FIVE significant figures

How many are the following examples?

Example 3: 65000

Example 4: 80000

SIGNIFICANT DIGITS

PRACTICE:

1. 100.002
2. 1000
3. 1000.
4. 1000.0
5. 12345
6. 1234.00
7. 120088
8. 000.00067
9. 123.1010
10. 3

SIGNIFICANT DIGITS

PRACTICE:

1.	100.002	(6)
2.	1000	(1)
3.	1000.	(4)
4.	1000.0	(5)
5.	12345	(5)
6.	1234.00	(6)
7.	120088	(6)
8.	000.00067	(2)
9.	123.1010	(7)
10.	3	(1)

Write 89,450,000 in scientific notation with one, two, three, four, and five significant digits:

- ONE: 9×10^7
- TWO: 8.9×10^7
- THREE: 8.95×10^7
- FOUR: 8.945×10^7
- FIVE: 8.9450×10^7

YOU TRY:

Write 00.000034500 in scientific notation with one, two, three, four, and five significant digits:

YOU TRY:

Write 00.000034500 in scientific notation with one, two, three, four, and five significant digits:

ONE: 3×10^{-5}

TWO: 3.5×10^{-5}

THREE: 3.45×10^{-5}

FOUR: 3.450×10^{-5}

FIVE: 3.4500×10^{-5}

DONE

HOMEWORK DUE NOW (*)

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19, 20, 30, 31, 33, 37, 39, 40, 41