SIGNIFICANT FIGURES

Significant figures are used to establish the number which is presented in the form of digits. These digits carry a meaningful representation of numbers. The term significant digits are also used often instead of figures. We can identify the number of significant digits by counting all the values starting from the 1st non-zero digit located on the left. For example, 12.45 has four significant digits.

Definition

The significant figures of a given number are those significant or important digits, which convey the meaning according to its accuracy. For example, 6.658 has four significant digits. These substantial figures provide precision to the numbers. They are also termed as significant digits.

Rules for Significant Figures

- All non-zero digits are significant. 198745 contains six significant digits.
- All zeros that occur between any two non-zero digits are significant. For example, 108.0097 contains seven significant digits.
- All zeros that are on the right of a decimal point and also to the left of a non-zero digit is never significant. For example, 0.00798 contained three significant digits.
- All zeros that are on the right of a decimal point are significant, only if, a non-zero digit does not follow them. For example, 20.00 contains four significant digits.
- All the zeros that are on the right of the last non-zero digit, after the decimal point, are significant. For example, 0.0079800 contains five significant digits.
- All the zeros that are on the right of the last non-zero digit are significant if they come from a measurement. For example, 1090 m contains four significant digits.

Rounding Significant Figures

A number is rounded off to the required number of significant digits by leaving one or more digits from the right. When the first digit in left is less than 5, the last digit held should remain constant. When the first digit is greater than 5, the last digit is rounded up. When the digit left is exactly 5, the number held is rounded up or down to receive an even number. When more than one digit is left, rounding off should be done as a whole instead of one digit at a time.

There are two rules to round off the significant numbers:

First, we have to check, up to which digit the rounding off should be performed. If the number after the rounding off digit is less than 5, then we have to exclude all the numbers present on the right side.

But if the digit next to the rounding off digit is greater than 5, then we have to add 1 to the rounding off digit and exclude the other numbers on the right side.

Ex. Identify the number of significant digits/figures in the following given numbers.
45, 0.046, 7.4220, 5002, 3800

Sol: Number of Significant digits/figures

45	Two
0.046	Two
7.4220	Five
5002	Four
3800	Two

Ex. Write 12.378162 correct to 4 significant digits.

Sol: The number 12.378162, rounded to 4 significant digits is 12.38
Hence, 12.38 is the answer.