SI-Physics

Significant Digits

Question:

How do you know when a digit is significant?

1. All non-zero digits are significant.

   146.73 cm   5 significant digits

2. All zeroes between significant digits are themselves significant.

   1200.25 km   6 significant digits

3. All zeroes to the LEFT of an <u>understood</u> decimal point, but to the RIGHT of a non-zero digit <u>ARE NOT</u> significant.

   67000 s   2 significant digits

4. All zeroes to the LEFT of an <u>expressed</u> decimal point and to the RIGHT of a non-zero digit <u>ARE</u> significant.

   202000. m/s   6 significant digits

5. All zeroes to the RIGHT of a decimal point, but to the LEFT of the first non-zero digit <u>ARE NOT</u> significant.

   0.000067 m   2 significant digits

6. All zeroes to the RIGHT of a decimal point and to the RIGHT of a non-zero digit <u>ARE</u> significant.

   0.07080 hr   4 significant digits
   20.00 s   4 significant digits

7. All digits expressed in FRONT of a power of ten for quantities given in scientific notation <u>ARE</u> significant.

   1.496 x 10^{11} m   4 significant digits

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Mathematics and Significant Digits

•When multiplying or dividing quantities, the number of significant digits in the final answer is determined by the quantity with the FEWEST number of significant digits.

    Example:

          48.72 cm   (4 s.d.)
          <u>x 3.51 cm</u>   (3 s.d.)
          171.0072 cm^2
        which becomes 171 cm^2

Problems:

1.   *428.3 s x 2.4 m/s*

2.   *38 kg/m^3 x 22.4 m^3*

3.   *48.2 cm ÷ 12.0 s*

4.   *3.47 kg ÷ 48 cm^3*

•When quantities are added or subtracted, the number of significant digits in the final answer is determined by the PLACE VALUES REPRESENTED.

    Example:

          28.3 m   tenths place
          <u>+ 3.76 m</u>   hundredths place
          32.06 m
        which becomes 32.1 m.

Problems:

5.   *22.3 cm + 3.45 cm*

6.   *7.2 s + 15 s*

7.   *6.0 kg - 5.34 kg*

8.   *48 m - 0.025 m*