MATH 101
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Scientific Notation. Conversions

1. Calculate and express the answer in scientific notation:

   a)
   $$\frac{\sqrt{0.004} - (0.02)^3 + (3.46)^{-3}}{6.73 \cdot 10^{-3}}$$

   b)
   $$\frac{(0.514)^4 + \sqrt{44 \cdot 10^{-3}} - (3.46)^{-2}}{4.35 \cdot 10^2}$$

2. Use the following relations

   $$\begin{aligned} 1 \text{ cm} &= 10^{-2} \text{ m} \\ 1 \text{ km} &= 10^3 \text{ m} \\ 1 \text{ inch} &= 2.54 \text{ cm} \\ 1 \text{ l} &= 10^3 \text{ cm}^3 \end{aligned}$$

   to convert:

   a) $7.23 \cdot 10^6$ kilometers to centimeters.

   b) $5.73 \cdot 10^5$ square meters to square inches.

   c) $3.26 \cdot 10^4$ liters to cubic meters.

   d) 39.2 cubic meters to liters.

3. One mole of any substance is an amount equal to its molecular weight in grams. Avogadro's number is the number of molecules in a mole and is equal to $6.02 \cdot 10^{23}$. Knowing that the atomic weight of hydrogen, carbon and oxygen are 1, 12 and 16, respectively, convert the following.

   a) 20g of water to number of molecules of water.

   b) 10^{20} molecules of water to grams of water.

   c) Find how many molecules are there in 25 g of carbon dioxide CO_2.

   d) Find how much 10^{16} molecules of $C_{27}H_{46}O$ weigh.

Solutions.

1. a) $1.298 \cdot 10^1$ b) $4.51 \cdot 10^{-4}$

2. a) $7.23 \cdot 10^{11}$ cm b) $8.88 \cdot 10^8$ in^2 c) $3.26 \cdot 10^1$ m^3 d) $3.92 \cdot 10^4$ l.

3. a) $6.69 \cdot 10^{23}$ molecules b) $2.99 \cdot 10^{-3}$ grams c) $3.42 \cdot 10^{23}$ molecules d) $6.41 \cdot 10^{-6}$ grams.