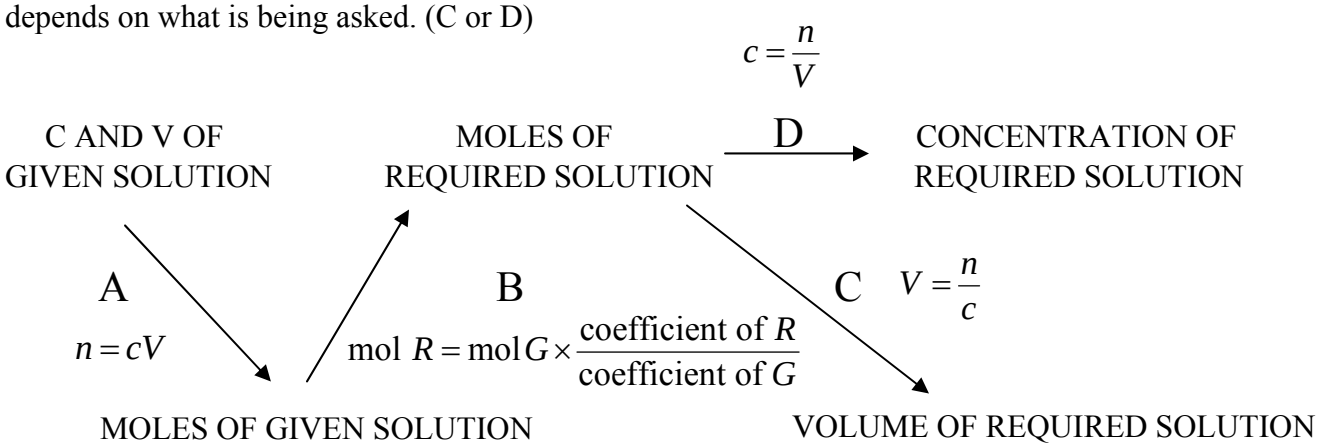
DATE: NAME: CLASS:

CHAPTER 7 HANDOUT	Solution Stoichiometry Tutorial	BLM 7.2.4

Calculations proceed from a given solution to a question about either the concentration or the volume of the required solution. Both volume and concentration of the given solution must be known, and either the volume or the concentration of the required solution must be given as well. Usually three calculations are required. The first two are usually the same (A,B) and the last one depends on what is being asked. (C or D)



An example will illustrate how to do this type of calculation. Again, you can use the above formulas or you can use unit analysis, where no formulas are required.

What volume of 0.834 mol/L sodium hydroxide would react with 23.7 mL of 1.24 mol/L sulfuric acid.?

$$2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(\ell)$$

1. Solution using formulas:

(a) moles of sulfuric acid $= (0.0237\,\text{L})\left(1.24\,\frac{\text{mol}}{\text{L}}\right) = 0.0294\,\text{mol}\,H_2SO_4(aq)$

(b) moles of sodium hydroxide $= (0.0294\,\text{mol}\,H_2SO_4)\left(\frac{2\ \text{mol NaOH}}{1\ \text{mol}\,H_2SO_4}\right) = 0.0588\,\text{mol NaOH(aq)}$

(c) volume of sodium hydroxide $= \frac{0.0588\,\text{mol NaOH}}{0.834\,\frac{\text{mol}}{\text{L}}} = 0.0705\,\text{L NaOH(aq)}$

2. Solution using unit analysis:

$$\text{L of NaOH} = \left(0.0237\ \text{L}\,\cancel{H_2SO_4}\right)\left(\frac{1.24\ \cancel{\text{mol}\,H_2SO_4}}{\text{L}\ \cancel{H_2SO_4}}\right)\left(\frac{2\ \cancel{\text{mol NaOH}}}{1\ \cancel{\text{mol}\,H_2SO_4}}\right)\left(\frac{\text{L NaOH}}{0.834\ \cancel{\text{mol NaOH}}}\right)$$

$$= 0.0705\,\text{L NaOH(aq)}$$

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