Molarity

1. Calculate the molarity of the following solutions.
   a) 825 cm^3 that contains 30.0 g of acetic acid.
   b) 2050 cm^3 that contains 49.0 g of phosphoric acid.
   c) 1.50 dm^3 that contains 1.0 g of potassium hydroxide.
   d) 500.0 cm^3 that contains 82.0 g of calcium nitrate.
   e) 250.0 cm^3 that contains 50.0 g of copper(II) sulfate pentahydrate.
   f) 1000.0 cm^3 that contains 116 g of sodium carbonate heptahydrate.
   g) 2.00 L that contains 36.0 g of glucose ($C_6H_{12}O_6$).
2. Calculate the volume of solution that can be made from each of the following.
   a) A 2.00 M solution using 80.0 g of sodium hydroxide.
   b) A 0.500 M solution using 80.0 g of sodium hydroxide.
   c) A 6.00 M solution using 126 g of calcium nitrate.
   d) A 0.100 M solution using 117 g of sodium chloride.
   e) A 1.00 M solution using 50.0 g of copper(II) sulfate pentahydrate.
   f) a 0.200 M solution using 200.0 g of sodium sulfide.
3. Calculate the mass of solute in the following solutions.
   a) 750.0 mL of 0.500 M calcium chloride.
   b) 3000.0 mL of 2.50 M potassium hydroxide.
   c) 250.0 mL of 2.00 M sodium sulfate.
   d) 250.0 cm^3 of 2.00 M sodium sulfate heptahydrate.
   e) 1.500 dm^3 of 0.240 M potassium dihydrogen phosphate.
   f) 2500.0 cm^3 of 4.00 M potassium permanganate.
   g) 250.0 mL of 2.00 M calcium chloride.
   h) 225 mL of 0.0350 kmol/m^3 calcium chloride.
   i) 3.45 L of 0.175 kmol/m^3 sodium phosphate.

*4. How would you prepare the following solutions?
   a) 1.00 L of 0.500 kmol/m^3 $MnSO_4$, using solid $MnSO_4 \bullet 7H_2O$
   b) 125 mL of 0.100 kmol/m^3 $Fe_2(SO_4)_3$, using solid $Fe_2(SO_4)_3 \bullet 9H_2O$
   c) 250.0 mL of 0.0250 kmol/m^3 $Co(NO_3)_2$, using solid $Co(NO_3)_2 \bullet 6H_2O$
   d) 35.5 mL of 0.001 25 kmol/m^3 Cl^-, using solid $SnCl_2 \bullet 2H_2O$
   e) 55.0 mL of 0.550 kmol/m^3 SO_4^{2-}, using solid $Al_2(SO_4)_3 \bullet 18H_2O$
   f) 225 mL of 0.002 00 kmol/m^3 OH^-, using solid $Ca(OH)_2$.

5. Complete the following table for aqueous solutions of glucose, $C_6H_{12}O_6$.

Mass of Solute	Moles of Solute	Volume of Solution	Molarity
12.5g		219 mL	
	1.08 mol		0.519 M
		1.62 L	1.08 M

6. A teacher needs to prepare 15 sets of solutions for a chemistry lab. Each se must have 70.0 cm^3 of 0.200 M iron(II) sulfate heptahydrate. What mass of iron(II) sulfate heptahydrate is required to prepare enough solution for the class?
7. How would you prepare the following solutions?
   a) 2.50 L of 0.375 kmol/m^3 solution using 15.4 kmol/m^3 nitric acid?
   b) 45.5 L of 0.0375 kmol/m^3 solution using 14.6 kmol/m^3 phosphoric acid?
   c) 500.0 mL of 0.500 mol/L solution, using 2.00 mol/L sodium chloride.
   d) 2.00 L of 0.200 mol/L solution, using 0.500 mol/L magnesium sulfate.
   e) 50.0 mL of 0.200 mol/L solution, using 4.00 mol/L potassium nitrate.
   f) 1.50 L of 0.250 mol/L solution, using 15.4 mol/L nitric acid.
8. What is the molar concentration of the nitric acid solution resulting from the mixture of 5.00 mL of 3.50 kmol/m^3 nitric acid and 95.0 mL of 0.200 kmol/m^3 nitric acid?
9. If one drop (0.050 mL) of 0.200 kmol/m^3 sodium bromide is added to 100.00 mL of water, what is the concentration of the resulting solution?
10. What is the concentration of the solution that results when 250.0 mL of 0.400 M sodium hydroxide is mixed with 500.0 mL of 2.00 M sodium hydroxide.
11. If 300.0 mL of solution A contains 25.0 g of potassium chloride and 250.0 mL of solution B contains 60.0 g of potassium chloride, what is the molar concentration of the potassium chloride solution resulting form the mixture of solutions A and B?

*12. Solution A is 0.475 kmol/m^3 in sodium hydroxide. Solution B also contains sodium hydroxide. When 250.0 mL of solution A is mixed with 400.0 mL of solution B, the resulting solution is 0.325 kmol/m^3 in sodium hydroxide. What is the molar concentration of solution B?

*13. Solution X is 0.135 kmol/m^3 in sodium chloride. Solution Y also contains sodium chloride. When 55.0 mL of solution X is mixed with 125 mL of solution Y, the resulting solution is 0.165 kmol/m^3 in sodium chloride. How many grams of sodium chloride are contained in 300.0 mL of solution y?

*14. Solution A is 0.125 M sodium hydroxide and Solution B is 2.50 M sodium hydroxide. What volume of Solution B must be added to 400.0 mL of Solution A if the concentration of the resulting solution is 1.75 M sodium hydroxide?

15. What is the concentration of a sodium hydroxide solution that results when 75.0 mL of 0.125 M sodium hydroxide is mixed with 50.0 mL of 2.50 M sodium hydroxide?