1. What is the formula for computing dilutions? $M_1 V_1 = M_2 V_2$

2. What does the term "concentrated" mean? What word has the opposite meaning of the term "concentrated"? → Large amt of solute per unit volume.

dilute is opposite of concentrated.

$M_1 V_1 = M_2 V_2$

$(4)(20) = M_2 (68.3)$ $M_2 ←$

$1.17M = M_2$

3. What is the molarity of the solution that results from diluting 20.0 ml of a 4.00M solution to a new volume of 68.3 ml? → V_1 → M_1 → V_2

$M_2 = ?$

4. What is the molarity of the solution that results from diluting 30.0 ml of a 9.02M solution to a new volume of 45.0 ml? → V_1 → M_1 → V_2

$M_1 V_1 = M_2 V_2$ $(9.02M)(30.0ml) = (M_2)(45.0ml)$ $M_2 = 6.01M$

5. A student needs to prepare 50.0 mL of a 0.250 M solution of HCl (aq). The only solution available, however, is a 3.00 M stock solution of HCl (aq). How will the student prepare the needed solution? → M_1 → V_2 → M_2

$M_1 V_1 = M_2 V_2$

$V_1 = \dfrac{M_2 V_2}{M_1} = \dfrac{(.25)(50)}{3} = 4.17 ml$

Answer: place 4.17 ml of the stock (3M) solution in a 50-ml volumetric flask. Dilute w/H₂O to 50ml. Invert 10-20 times to mix thoroughly.

6. A student needs to prepare 25.0 mL of a 0.600 M solution of NaOH (aq). The only solution available, however, is a 10.00 M stock solution of NaOH (aq). How will the student prepare the needed solution? → M_1 → V_2 → M_2

$V_1 = \dfrac{M_2 V_2}{M_1} = \dfrac{(0.6)(25)}{10} = 1.5 ml$

*Dilute 1.5 ml of original solution w/ water to obtain a total volume of 25.0 ml. Invert 10 to 20 times to mix thoroughly.

7. An aqueous solution of NaCl has a concentration of 0.500 M. If 35.0 mL of this solution is allowed to evaporate to a volume of 20.0 ml, → M_1 → V_1
   a. Is the solution more concentrated or more dilute afterwards?
   b. What is the new concentration of the solution?

$V_2 ←$

(a) if you evaporate it, you're letting water go away. Less solvent = more concentrated.

(b) $M_1 V_1 = M_2 V_2$

$M_2 = \dfrac{M_1 V_1}{V_2} = \dfrac{(.5)(35)}{20} = 0.875 M$