Molarity and Dilutions Worksheet

1. If you dilute 175 mL of a 1.6 M solution of LiCl to 1.0 L, determine the new concentration of the solution.

2. You need to make 10.0 L of 1.2 M KNO_3. What molarity would the potassium nitrate solution need to be if you were to use only 2.5 L of it?

3. How many milliliters of 5.0 M copper(II) sulfate solution must be added to 160 mL of water to achieve a 0.30 M copper(II) sulfate solution?

4. What volume of 4.50 M HCl can be made by mixing 5.65 M HCl with 250.0 mL of 3.55 M HCl?

   (Hint: you can use this variation of the dilution formula: $M_1V_1 + M_2V_2 = M_3V_3$)

5. A 40.0 mL volume of 1.80 M $Fe(NO_3)_3$ is mixed with 21.5 mL of 0.808M $Fe(NO_3)_3$ solution. Calculate the molar concentration of the final solution.

6. To 2.00 L of 0.445 M HCl, you add 3.88 L of a second HCl solution of an unknown concentration. The resulting solution is 0.974 M. Assuming the volumes are additive, calculate the molarity of the second HCl solution.

7. To what volume should you dilute 133 mL of an 7.90 M $CuCl_2$ solution so that 51.5 mL of the diluted solution contains 4.49 g $CuCl_2$?

8. If volumes are additive and 95.0 mL of 0.55 M KBr is mixed with 165.0 mL of a $BaBr_2$ solution to give a new solution in which $[Br^-]$ is 0.65 M, what is the concentration of the $BaBr_2$ used to make the new solution?

9. 1.00 L of a solution is prepared by dissolving 125.6 g of NaF in it. If I took 180 mL of that solution and diluted it to 500 mL, determine the molarity of the resulting solution.

10. What is the molar concentration of chloride ions in a solution prepared by mixing 100.0 mL of 2.0 M KCl with 50.0 mL of a 1.50 M $CaCl_2$ solution?

    (Warning: there's a complication in the solution. It has to do with the $CaCl_2$.)