

Molarity (M)

Names _____

Molarity is a measure of the concentration of a solution. The unit for molarity is a capital *M*. Molarity is calculated by dividing the amount of solute in moles by the volume of the solution in liters. Occasionally you will be provided the mass of the solute in grams that will be dissolved, and you must convert the mass to moles before you make your calculation. Also, if you have a different volume unit, such as mL, you must convert to liters (L) before calculating the Molarity. Remember that 1,000 mL = 1.000 L.

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{Liters of Solution}}$$

Solve the problems below. Show all your work and include units on your work and the final answer. Answers should be expressed to the correct number of significant figures.

1. What is the molarity of a solution in which 2.5 moles of NaNO_3 are dissolved in 0.85 L of solution?
2. What is the molarity of a solution in which 101 grams of NaCl are dissolved in 1.0 L of solution?
3. A 6 M solution has 12 moles of substance dissolved in it. What is the volume of the solution?
4. What is the molarity of a solution in which 10.0 g of AgNO_3 are dissolved in 500. mL of solution?
5. If you dissolve 95.6 g of MgCl_2 in 500.0 mL of water, what is the molarity of the solution?
6. What is the molarity of hydrochloric acid (HCl) which has 250 g dissolved in 2,300 mL of solvent?

7. How many moles of SrO are present in 450 mL of 3.5 M solution?

8. How many grams of SrO would be present?

9. What is the volume of a 6.0 M solution of NaCl if there are 2.5 moles dissolved in the liquid?

10. How many grams of KNO_3 should be used to prepare a 2.00 L of a 0.500 M solution?

11. To what volume should 5.0 g KCl be diluted in order to prepare a 0.25 M solution?

12. How many grams of CuSO_4 are needed to prepare 100. mL of a 0.10 M solution?

13. The nitric acid (HNO_3) solution has a concentration of 4.0 M. If the solution has a volume of 750. mL, how many grams of HNO_3 are dissolved in the solvent?