Molarity Problems Worksheet Key

$M = \frac{n}{V}$ - n= # moles - V must be in liters (if in mL you must change to L) - Use M or mol/L as unit for molarity $M = \frac{mol}{L}$

1. What is the molarity of a 0.30 liter solution containing 0.50 moles of NaCl?

$M = \frac{mol}{L} = \frac{.5\ mol}{.3\ L} = \boxed{1.67\ M}$

2. Calculate the molarity of 0.289 moles of $FeCl_3$ dissolved in 120 ml of solution?

$\frac{0.289\ mol\ FeCl_3}{.120\ L} = \boxed{2.41\ M}$ → .12 L

3. If a 0.075 liter solution contains 0.0877 moles of $CuCO_4$, what is the molarity?

$\frac{0.0877\ mol\ CuCO_4}{0.075\ L} = \boxed{1.17\ M}$

4. How many moles of NaCl are present in 600. ml a 1.55 M NaCl solution?

$(.6)\ 1.55\ M = \frac{mol}{.6\ L}$ .6 L $\boxed{0.93\ mol\ NaCl}$

5. How many moles of H_2SO_4 are present in 1.63 liters of a 0.954 M solution?

$0.954\ M = \frac{mol}{1.63\ L} = \boxed{1.56\ mol\ H_2SO_4}$

6. How many liters of solution are needed to make a 1.66 M solution containing 2.11 moles of $KMnO_4$?

$1.66\ M = \frac{2.11\ mol}{L} = \boxed{1.27\ L}$

7. What volume of a 0.25 M solution can be made using 0.55 moles of $Ca(OH)_2$?

$0.25\ M = \frac{0.55\ mol}{L} = \boxed{2.2\ L}$

For all of the problems below you will need to do a mole-mass conversion. Each problem will involve two steps.

8. What is the molarity in 650. ml of solution containing 63 grams of NaCl?

$$\frac{63\text{g NaCl}}{} \left| \frac{1\text{ mol NaCl}}{58.45\text{g NaCl}} = \frac{1.08\text{mol}}{.65\text{ L}} = \boxed{1.66\text{ M}} \right.$$

9. How many grams of $Ca(OH)_2$ are needed to produce 500. ml of 1.66 M $Ca(OH)_2$ solution?

$$1.66\text{M} = \frac{\text{mol}}{.5\text{L}} = .83\text{mol Ca(OH)}_2 \left| \frac{74.08\text{g Ca(OH)}_2}{1\text{mol Ca(OH)}_2} = \boxed{61.49\text{g Ca(OH)}_2} \right.$$

10. What volume of a 0.88 M solution can be made using 130. grams of $FeCl_2$?

$$\frac{130\text{g FeCl}_2}{} \left| \frac{1\text{ mol FeCl}_2}{126.75\text{g FeCl}_2} = \frac{1.03\text{mol}}{\text{L}} = 0.88 = \boxed{1.17\text{L}} \right.$$