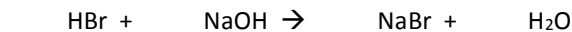


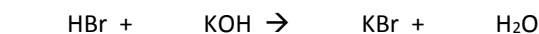
## Acid-Base Neutralization & Titrations Practice

Name: \_\_\_\_\_

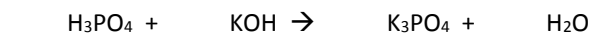
1. A 35.0 mL sample of NaOH solution is titrated to an end point by 14.8 mL 0.412M HBr solution. What is the molarity of the NaOH solution?



2. If 25.0 mL of KOH were needed to neutralize 15.0 mL of 3.50M HBr, calculate the molarity of the base.



3. It required 34.0 mL of 1.90M KOH to neutralize 25.0 mL of H<sub>3</sub>PO<sub>4</sub>. Calculate the molarity of the phosphoric acid.



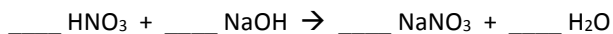
4. A student titrated 20.0 mL of 0.500M HNO<sub>3</sub> with NaOH. Her data is shown in the following table.

a. Complete the following table:

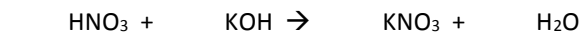
	Trial 1	Trial 2	Trial 3
INITIAL VOLUME NaOH	0.00 mL	15.3 mL	30.4 mL
FINAL VOLUME NaOH	15.3 mL	30.4 mL	45.3 mL
VOLUME NaOH used	_____	_____	_____

b. Calculate the average volume of NaOH used from the three trials.

c. Use your average volume of NaOH used to calculate the molarity of the base.

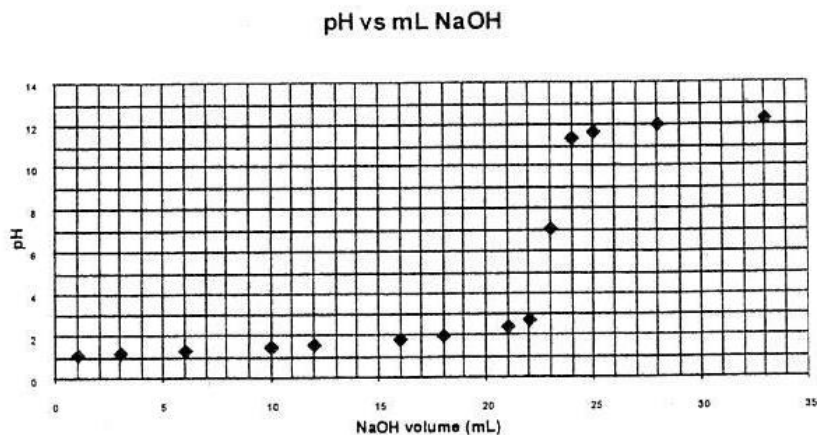


5. What is the molarity of a nitric acid solution if 43.3 mL of 0.100M potassium hydroxide solution is needed to neutralize 20.0 mL of the unknown concentration of nitric acid solution?



## Titration Problems

- 1) You have a solution of HBr of unknown concentration. To figure out the concentration, you measure out 25 mL of the acid solution. You then begin adding 0.100M NaOH solution and measuring the pH after each addition. The graph of pH vs mL NaOH looks like this:



- At what volume of NaOH solution was the HBr consumed? (This is called the equivalence point)
- Write a balanced equation for the reaction.
- Calculate the moles of acid that must have been in the original 25 mL of acid.
- Calculate the concentration of the original acid solution.