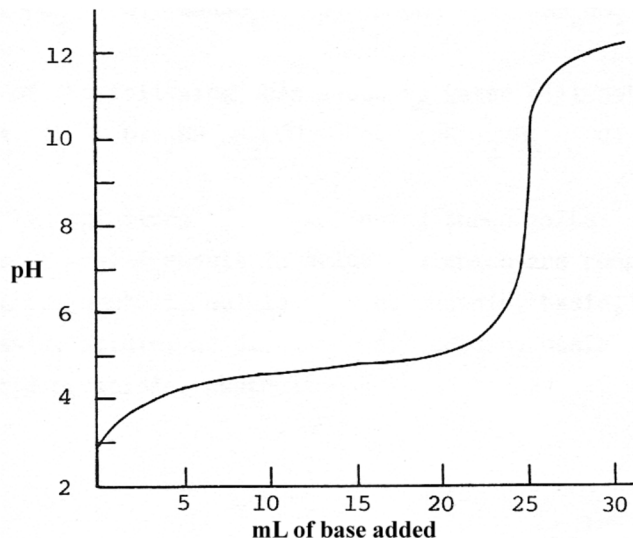


## Acid-Base Titrations Practice WS

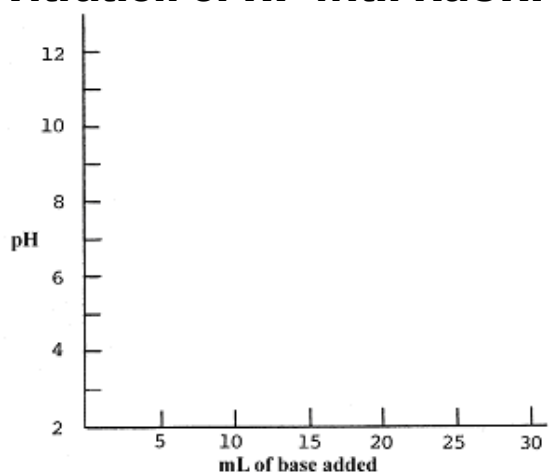
### Information from the Curve:

There are several things you can read from the titration curve itself. Consider this titration curve.



1. This is a (*strong/weak*) acid titrated with a strong base. The acid is (*monoprotic/diprotic*).
2. Place a dot (●) on the curve at the equivalence point. The pH at the equivalence point is \_\_\_\_.
3. What volume of base was used to titrate the acid solution? \_\_\_\_\_ mL
4. Place a box (■) on the curve where the pH of the solution = the  $pK_a$  of the acid.  
What is the pH at this point? \_\_\_\_\_  
What is the  $pK_a$  of the acid? \_\_\_\_\_  
What is the  $K_a$  of the acid? \_\_\_\_\_

## Titration of HF with NaOH:



- Hydrofluoric acid, HF, has a  $K_a = 7.2 \times 10^{-4}$ . Calculate the pH of 10.0 mL of a 0.050 M solution of HF. Plot this point on the axes.
- A 0.020 M solution of NaOH is used for the titration. What volume will be needed to reach the equivalence point?
- Write the net reaction for the neutralization of a solution of HF with a solution of NaOH.
- Calculate the moles of  $F^-$  at the equivalence point: \_\_\_\_\_ moles.  
What is the total volume? \_\_\_\_\_ L  
The  $[F^-]$  at the equivalence point is \_\_\_\_\_ M
- Calculate the pH of the solution at the equivalence point. Use this information and the answer to question 6 to plot the equivalence point on your graph.

10. What is the pH halfway to the equivalence point? Plot this point on your graph.
  
11. How many moles of HF are in the original 10.0 mL sample of HF?
  
12. When only 5.0 mL of 0.020 M NaOH has been added, calculate the moles of HF left and F<sup>-</sup> produced.
  
13. Use the Henderson-Hasselbalch equation to calculate the pH when 5.0 mL of base has been added. Plot this point on your graph.
  
14. When 20.0 mL of 0.020 M NaOH has been added, calculate the moles of HF left and F<sup>-</sup> produced.
  
15. Use the Henderson-Hasselbalch equation to calculate the pH when 20.0 mL of base has been added. Plot this point on your graph.

16. When 30.0 mL of base is added, how many moles of  $\text{OH}^-$  is in excess? \_\_\_\_\_

The total volume is \_\_\_\_\_ L.

$[\text{OH}^-] =$  \_\_\_\_\_

$\text{pOH} =$  \_\_\_\_\_  $\text{pH} =$  \_\_\_\_\_

Plot this point on your graph.

17. Sketch the titration curve on your graph.

**Weak Base-Strong Acid Curve:**

A 20.0 mL sample of 0.10 M  $\text{CH}_3\text{NH}_2$  (methyl amine) is titrated with 0.15 M  $\text{HCl}$ . The  $K_b$  for  $\text{CH}_3\text{NH}_2 = 4.2 \times 10^{-4}$ .

Do the appropriate calculations to sketch a titration curve for this titration.

