Titrations

1. Write a balanced neutralization reaction, and calculate the unknown quantity for the complete neutralization of the following.

	Acid		Base	
	Concentration	Volume	Concentration	Volume
a)	0.250 M HCl	30.0 cm³	? NaOH	25.0 cm³
b)	0.500 M H_2SO_4	?	0.750 M KOH	20.0 cm³
c)	? HNO_3	15.0 cm³	1.50 M NH_4OH	25.0 cm³
d)	0.400 M HNO_3	30.0 cm³	0.800 M NaOH	?

2. What is the molarity of a NaOH solution if 25.00 cm³ is required to completely neutralize 40.00 cm³ of a 1.50 M solution of H_2SO_4?

3. Calculate the volume of a 0.600 M solution of HNO_3 necessary to neutralize 28.55 cm³ of a 0.450 M solution of KOH.

4. A titration of 15.00 cm³ of household ammonia, NH_4OH(aq), required 38.57 cm³ of 0.780 M HCl. Calculate the molarity of the ammonia.

5. What volume of 0.250 M H_3PO_4 is required to neutralize 30.00 cm³ of a 0.0500 M $Ba(OH)_2$ solution?

6. What is the concentration of NaOH if 25.00 cm³ are neutralized by 40.80 cm³ of 0.125 M HCl?

7. 17.5 g of NaOH is dissolved in enough water to make 500.0 cm³ of solution. What volume of 0.625 M HBr would be required to neutralize 50.0 cm³ of the NaOH solution?

8. 31.6 cm³ of 0.125 M HNO_3 are required to neutralize a 25.0 cm³ sample of $Mg(OH)_2$. What is the concentration of the $Mg(OH)_2$?

9. A solution was prepared by dissolving 25.9 g of sodium hydroxide in enough water to make 500 cm³ of solution. 25.0 cm³ of this solution was titrated with 17.6 cm³ of hydrochloric acid. What is the concentration of the hydrochloric acid solution?

10. A solution was prepared by taking 8.60 cm³ of 18.0 M H_2SO_4 and diluting it to a volume of 750.0 cm3. 28.7 cm³ of this solution was required to completely neutralize 25.0 cm³ of a KOH solution. What is the molarity of the base?

11. What mass of $Ca(OH)_2$ would be required to completely neutralize 50.0 cm³ of 0.125 M HCl?

12. What mass of $Mg(OH)_2$ would be required to completely neutralize 70.0 cm³ of 0.175 M HNO_3?

13. A 1.20 g sample of an unknown acid is dissolved in water and titrated with 0.150 M NaOH to the equivalence point. The volume of base is 69.0 cm³. Calculate the molar mass of the acid. The titration curve shows that the acid is monoprotic.