Question #68916, Chemistry / General Chemistry

Why do we use titrations?

We use titration for determination of exact concentration of solution with unknown concentration
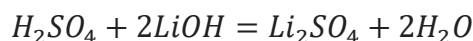
What is the equivalence point?

Equivalence point is the point in which mole number of titrant and solution with unknown concentration remain the same.

Answer the following question:

By titration, 17.6 mL of aqueous H2SO4 neutralized 27.4 mL of 0.0105 M LiOH solution. What was the molarity of the aqueous acid solution?

Write up the steps on how to calculate this titration. You can use any program that you like or just type them out in the message center. You can use my steps as a template but you must come up with your own (you can have more or less steps but I must be able to solve a titration problem with your steps). The steps must include the following:

Balancing the chemical reactions and include the balanced equation in your answer.

$$H_2SO_4 + 2LiOH = Li_2SO_4 + 2H_2O$$

Stating if the reagent and unknown are an acid or base.

Reagent LiOH is base, unknown H_2SO_4 is acid.

Explanation on how to calculate the moles from the titration. Why the equivalence point is need for the calculation. How to calculate molarity of the unknown.

Using Law of equivalence. In equivalence point:

$$n_{H_2SO_4} = n_{LiOH}$$

The mole number is a composition of concentration and volume uses in titration:

$$c_{H_2SO_4}V_{H_2SO_4} = c_{LiOH}V_{LiOH}$$

$$c_{H_2SO_4} \cdot 17.6\ mL = 0.0105\ M \cdot 27.4\ mL$$

$$c_{H_2SO_4} = \frac{0.0105\ M \cdot 27.4\ mL}{17.6\ mL} = 0.0163\ M$$

How to calculate the pH of the unknown after you have its molarity.

$$pH = -\lg[H^+] = -\lg[H_2SO_4]$$

Include the answer to the question.