1. You have (or will have) gone through an analysis of store-bought vinegar. The acid component in store-bought vinegar is acetic acid, HOAc (MW = 60.00, $K_a = 1.8 \times 10^{-5}$). You were also told that store-bought vinegar is typically described as "5.0% (w/v)" vinegar, where the "w/v" implies that this is a weight/volume percentage, i.e. $100 \times (\text{g HOAc/ml soln})$. This, of course, is algebraically equivalent to the expression: $5.0 \text{ g HOAc/100 mL soln}$.

a) What is the pH of this 5.0% (w/v) store-bought vinegar?

b) In actuality, you never really titrate the store-bought vinegar. You took 25.00 mL of it, diluted it to 250 mL and then titrated a 50.00 mL portion of the resulting diluted soln. What, then, is the pH of the diluted vinegar solution which you actually titrated?

2. Suppose you manage to get your hands on 75.00 mL of 0.20 M HOAc, but you don’t get your hands on it very well; you drop this solution and it spills all over the floor. In the ensuing panic and confusion you also manage to knock over another beaker which contains 50.00 mL of 0.25 M NaOH (MW = 40.00) which also breaks and spills all over the floor, mixing thoroughly with the first breakage and spillage. As you survey this fine mess, answer the following:

a) Is the floor acidic or basic? (In other words, What are the species present with acid/base properties?) SHOW how you arrive at your answer.

b) What is the resulting pH of the floor (assuming its pH accrues only as a consequence of your nimble-fingered dexterity and is not influenced by any other condition)?