

These are examples of a pH curve using a student's data. I used a "scatter graph with smoothed lines". If you have enough points it will give a smooth enough line, probably as good or better than you will get by doing it by hand.

We would usually start a pH graph at the origin (0,0) but note I've started the y-axis at around 2. This is so we can get the points to spread out more to make it easier to read things from the graph. I've ended the graph at pH 12 and a volume of 12. This might differ a little for each graph. It depends on when and where your pH seems to level off. The student actually had 1 additional point all the way out around a volume of 16 mL with a pH of 11.88. I left that off. It had already leveled off enough around a volume of 11 or 12 mL.

Note I've set this for lots of grid lines. You **MUST** have lots of grid lines if you hope to be able to read volumes and pH values to 2 decimal places (which you should be doing). Set both major and minor grid lines and format your axes so you have major units every 1 ml and 1 pH unit and minor grid lines to 0.1 unit for each axis. How you do this depends on your version of Excel. I will assume most of you are using Excel 2007 or later (all are about the same). Once you have your graph in a separate window from the data (so it fills up the window) click on the "Layout" icon at the top. Then you will see a "Gridlines" icon. Choose "major and minor gridlines".

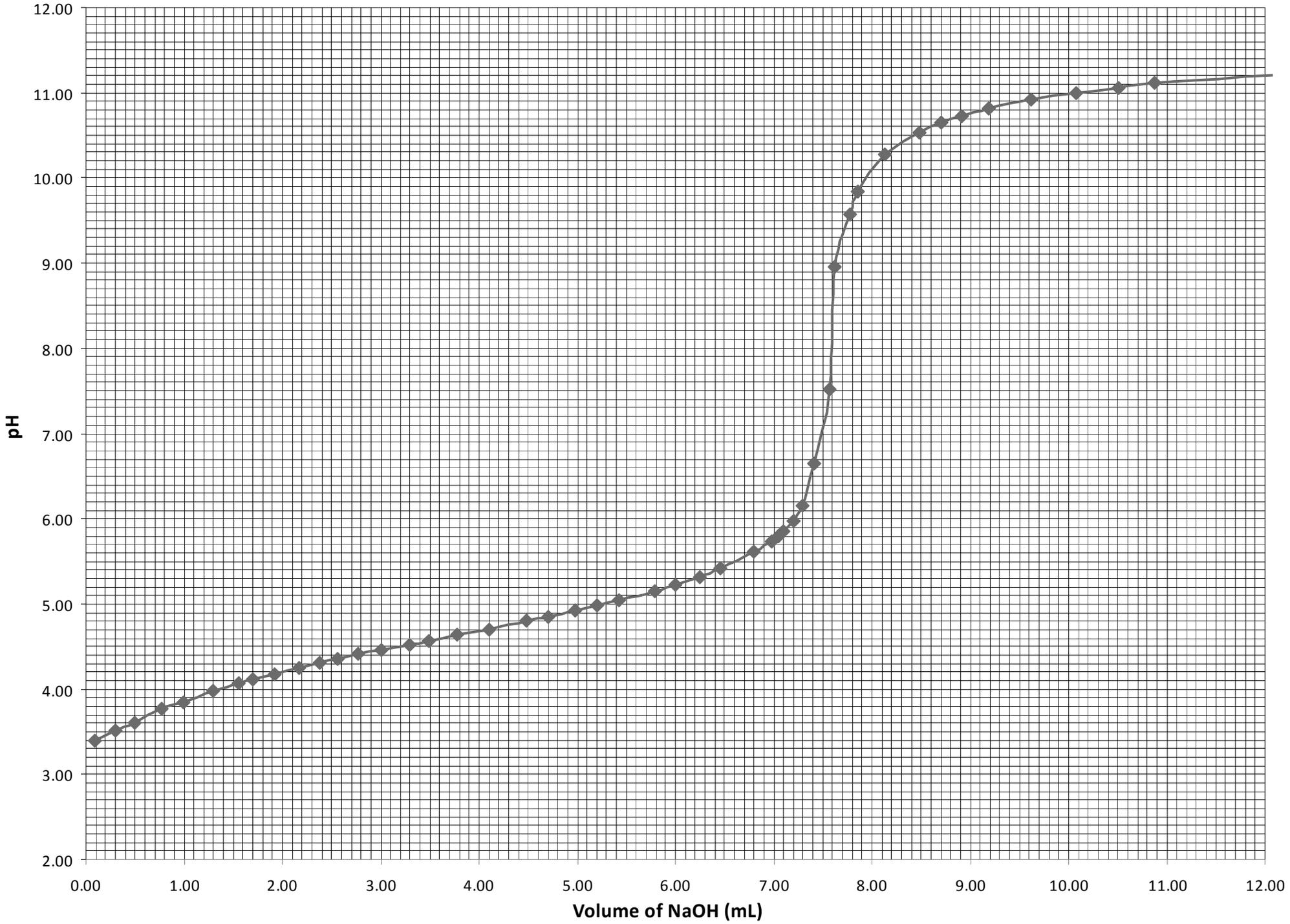
Once you have your gridlines right-click on an axis and choose "format axis". In the new window you can set the spacing for major and minor gridlines. You want to set the major grid line unit to 1 and the minor grid line unit to 0.1. This will give pH or volume labels every 1 unit and you will have 10 lines in between (at every 0.1 pH units or 0.1 mL). Make sure you set your data in your table to have 2 decimal places so it will be printed with 2 decimal places on the graph.

I've included a graph with the grid lines drawn. This is pretty much how it should look. I set my page margins to pretty much 0 inches (0.1 inches is okay). I made sure the graph took up most of the page. The titles and labels are a reasonable size so they don't take up much room (about 12 pt for the axes titles, 10 pt for the axes labels and about 14 or 16 pt for the graph title).

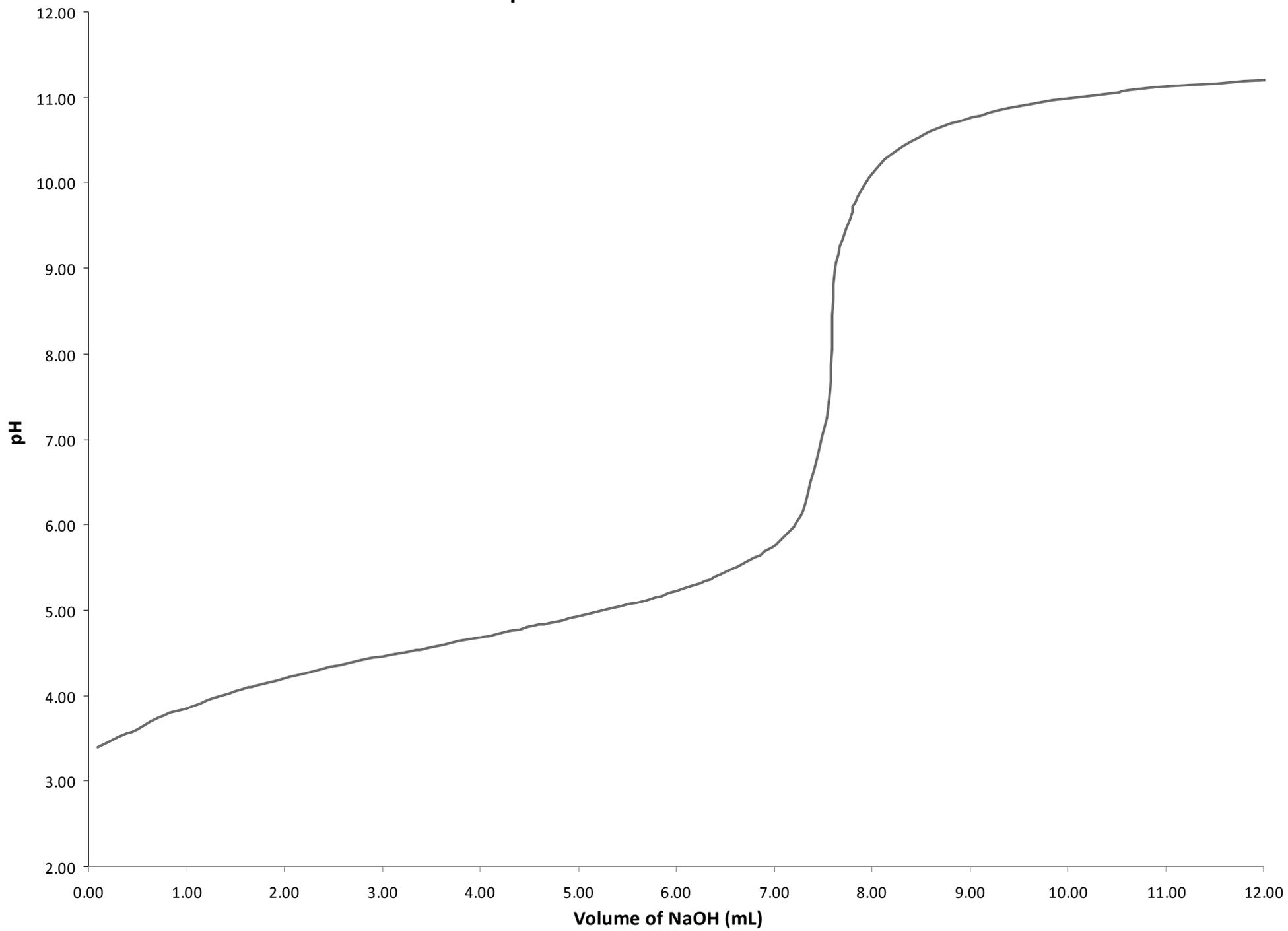
I've included a graph without grid lines so you can see the shape of the curve. I got this from doing the "scatter with smooth lines". If you have enough points it comes out pretty well. You can turn grid lines on or off by right-clicking in the chart area and then choosing "Chart Options". This may be slightly different in newer versions of Excel.

I've also had questions about how to find the eq. pt. This is a little bit of an "art" since you have to find the midpoint of the sharply rising region. In my Excel 2003 there is a way to draw lines on a chart by clicking on "Insert" at the top. I don't know if this is available in the newer versions. I've added a new graph in which I plotted only the area near the eq. pt. so it would be expanded and easier to read. Then I used this line drawing function to draw lines. By doing this I could pretty easily find the midpoint of the sharply rising region. This is not something you need to do or turn in. You can use the full graph and just draw in the lines yourself.

pH vs. Volume of NaOH



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pH vs. Volume of NaOH

