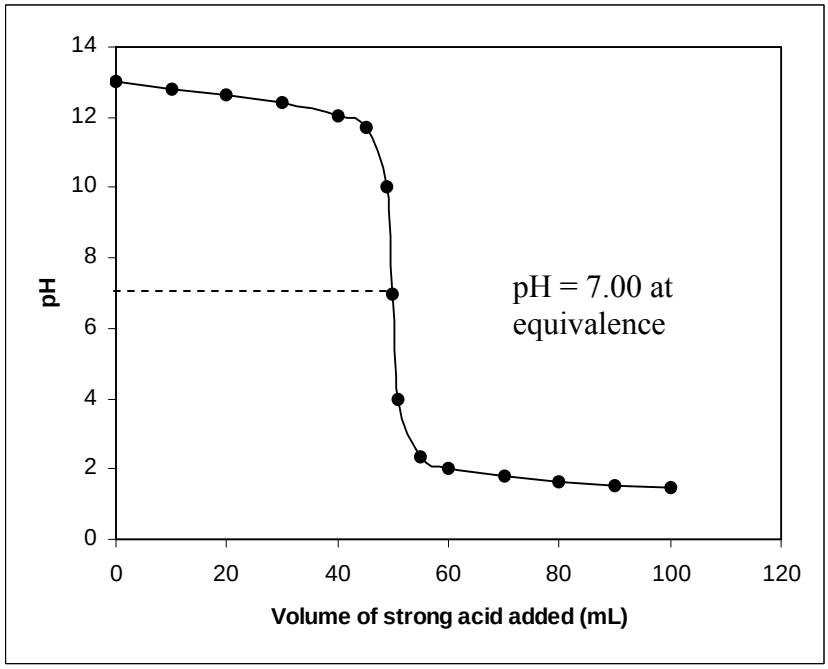
Thought Lab 8.2: Plotting a Titration Curve Answer Key

Answers to Analysis Questions

1. Your graph should be similar to the curve to the right. The best-fit lines should be smooth with a relatively sharp increase near the equivalence point (the corners should be curved and not sharp). Do not use a "connect the dots" approach.



2. The equivalence point should be labelled at pH 7.

3. You could select:
- methyl orange 3.2–4.4
- bromocresol green 3.8–5.4
- methyl red 4.8–6.0
- chlorophenol red 5.2–6.8
- bromothymol blue 6.0–7.6
- phenol red 6.6–8.0
- phenolphthalein 8.2–10.0

All of these indicators change colour in the steep portion of the curve. Phenolphthalein and phenol red are less appropriate because they change colour before equivalence. Methyl orange and bromocresol green are less appropriate because they change colour well after equivalence.

4. The curve may be shifted left or right (due to concentration differences), but overall the shape should be similar to Figure 8.9. Your curve should be a mirror image of the curve in Figure 8.8.

5. The concentration of KOH(aq) is 0.100 mol/L. The concentration of the acid is the same as the concentration of the base, because 50.00 mL of acid was required to neutralize 50.00 mL of base. Show your work. For example:

$$c_{KOH} = \frac{0.100\,\text{mol}\,HNO_3}{1\,\text{L}} \times \frac{50.00\,\text{mL}}{1} \times \frac{1\,\text{mol}\,KOH}{1\,\text{mol}\,HNO_3} \times \frac{1}{50.00\,\text{mL}\,KOH}$$

$$c_{KOH} = 0.100\,\frac{\text{mol}}{\text{L}}$$

Answer to Extension Question

6. Methyl violet would not be a suitable indicator, as it changes colour much too early in the titration, before the steep portion of the graph.