

Friday Worksheet
Volumetric 6

Name:

A wine bottle is marked as having an alcohol content of 13.0% v/v. In other words, for every 100 mL of wine 13.0 mL of ethanol is present. To test this claim a student conducted a titration to determine the amount of alcohol in 20.0 mL of wine.

Three 20.0 mL aliquots of the wine were titrated with a 1.652 M $K_2Cr_2O_7$ solution and an average titre of 20.00 mL was obtained.

Wine is thought to be a good source of antioxidants.

- 1) Write the balanced reduction reaction where $Cr_2O_7^{2-}$ is reduced to Cr^{3+}
- 2) Write the balanced half equation for the oxidation of CH_3CH_2OH to CH_3COOH
- 3) Write the overall balanced equation for the reaction.
- 4) Determine the mol of $Cr_2O_7^{2-}$ in the average titre.
- 5) Determine the mol of ethanol present in the 20.0 mL aliquot.
- 6) Determine the mass, in grams, of ethanol present in the 20.0 mL aliquot.
- 7) If ethanol has a density of 0.789 g/mL at room temperature what volume of ethanol is present in the 20.0 mL aliquot?
- 8) Calculate the concentration of the ethanol in %v/v to the right number of significant figures.

9) The table below represents the results from the three titrations conducted by the student.

<i>Titre</i>	<i>Start (mL)</i>	<i>Finish(mL)</i>	<i>Total (mL)</i>
1	0.00	21.20	21.20
2	21.20	40.06	19.94
3	1.20	20.20	19.00

- a) How accurate are the results of the investigation. Explain how the investigation can be changed to make the result more accurate.
- b) How would the student explain the higher percentage of alcohol in the wine?