### Income Distribution

One application of integration is to the business world and involves the Lorenz Curve. Not all Australians receive the same income. In fact the poorest ten percent of Australian families receive less than two percent of the total income and the richest ten percent receive about twenty five percent of the income. Distribution of income is shown by a Lorenz Curve, named after Konrad Lorenz, who devised the method in 1905. The *x*-axis shows the proportion of the population whose incomes are least. The y coordinate of points on the curve is the proportion of total income received by the proportion shown on the *x*-axis. Since both proportions are between 0 and 1, the graph only goes from (0, 0) to (1,1).

If everyone received the same income, it would be the straight line, *y = x*. The area between the curve and the line *y = x* gives a measure of the income inequality of a society. In fact, the coefficient of inequality is defined to compare the inequality of the distribution from one society to another. This coefficient of inequality is more commonly referred to as the Gini Coefficient.

Area between Lorenz Curve and the line *y = x*

Gini Coefficient = ----------------------------------------------------------

Area under the line *y = x*

1. **The Lorenz Curve of income distribution for a small country is approximately:**

***y* = 0.15 *x* + 0.35 *x* ³ + 0.5 *x* ²**

1. **Plot the Lorenz Curve.**
2. **What proportion of income is earned by the poorest 20% of the population?**
3. **What is the Gini Coefficient?**
4. **Collect the required income data from Australia, The United States and one lesser developed nation. You can get the data from sites such as the Australian Bureau of Statistics (**[**www.abs.gov.au**](http://www.abs.gov.au)**), the U.S Census Bureau (**[**www.census.gov**](http://www.census.gov)**) and the World Bank (**[**www.worldbank.org**](http://www.worldbank.org)**).** 
   1. **Determine the Lorenz Curve for each country.**
   2. **Evaluate the Gini Coefficient for each country.**