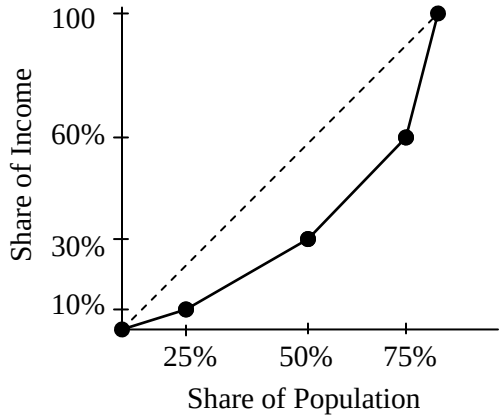
Suggested Solutions to Assignment 5

1. Suppose an economy consists of 4 persons with ranked income as [10, 20, 30, 40]

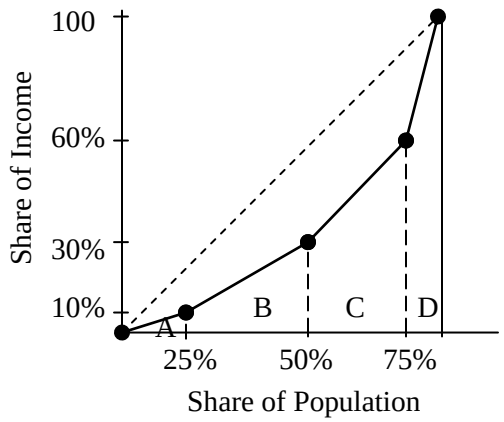
i. What is the cumulative income for this economy?

Cumulative Share of Population	Cumulative Share of Income
0	**0**
25	**10**
50	**30**
75	**60**
100	**100**

ii. Draw a Lorenz curve for this economy



iii. Calculate the Gini coefficient for this economy



Area of A = 0.5 x 25 x 10
Area of B = 0.5 x 25 x (10+30)
Area of C = 0.5 x 25 x (30+60)
Area of D = 0.5 x 25 x (60+100)
A+B+C+D = 3,750

◿ = 0.5 x 100 x 100 = 5,000

Area under 45 degree line and above Lorenz curve = 5,000-3,750 = 1,250

Gini coefficient = 1,250/5,000 = 0.25

iv. Find $IR_{20/20}$

First we need to find cumulative income contributed by the poorest 20% and the richest 20%. As the linear lines composing the Lorenz curve are associated with triangle A (the poorest 20%) and trapezoid D (the richest 20%), we can use them as a tool to fine IR.

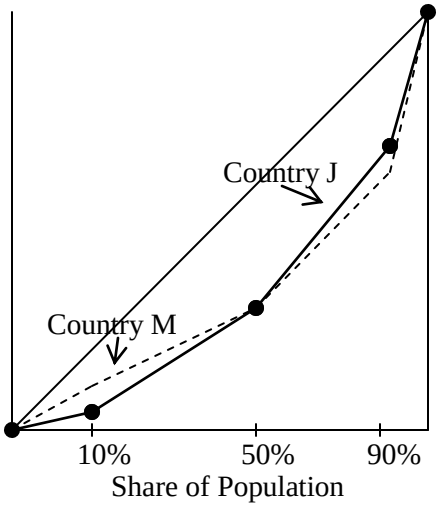
Slope of A = 10/25 = 0.4 => income contributed by the poorest 20% = 0.4 x 20 = 8

Slope of D = (100-60)/25 = 1.6 => income contributed by the richest 20% = 1.6 x 20 = 32

$IR_{20/20}$ = 32/8 = 4

2. Economist B's data are as follows:

Country J	**Country M**
Poorest 10% shares 2% of income	Poorest 10% shares 7% of income
Bottom 50% shares 30% of income	Bottom 50% shares 30% of income
Richest 10% shares 24% of income	Richest 10% shares 27% of income



Let's just plot the Lorenz curves for both economies. You can see that the two Lorenz curves *intersect*! When this happens, we *cannot* use just Lorenz curve for comparison. Other measures are needed, like the Gini coefficient, for example.

Thus Economist B is completely wrong to conclude that comparing Lorenz curves says something definitive about inequality. However, if she bases her judgment on other measures along with Lorenz curve, such as $IR_{10/10}$, she could make a conclusion.