

Quantitative Tools - level I  
Fall 2015  
Training exercises

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## 1 GDP of Farghestan

The nominal GDP of Farghestan is growing by 5% each quarter. The annual inflation is 3%

1. What is the annual growth rate of GDP ?
2. What is the real annual growth rate of GDP (*i.e* adjusted from the rate of inflation) ?
3. If both the nominal growth rate and the inflation rate stay constant, in how many years will the real GDP double ? In year 1515, the GDP of Farghestan is 1 million dollars. Three years later, it is 1.4 million dollars.
4. By how much, in percentages, the GDP of Farghestan has increased in those 3 years ?
5. What it is the annual average growth rate during those three years?

## 2 Bob and Alice Income

Bob is earning \$30,000 a year. Bob has a 12% bonus the first year. The second year, Bob's income is increased by 3% but he has no bonus. Alice is earning \$40,000 in year 1 and 43,000\$ in year 2.

	Prices	
	Year 1	Year 2
Hot chocolate	1	2
Rent	500	510
Internet subscription	30	20
Organic kale	1.5	2

Table 1: Prices of Goods

1. What is Bob income in year 1 ?
2. What is Bob income in year 2 ?
3. By how much does Alice income increase between year 1 & year 2 ?
4. Compute the elementary indexes of prices between year 1 & year 2.

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Quantities	
Bob	Alice
100	200
1	0.5
2	1
40	35

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Table 2: Quantities of goods consumed (same in year 1 &amp; year 2)

5. Compute the Laspeyres index for Bob and Alice
6. How has changed the purchasing power of Bob between year 1 & year 2 ? of Alice ?
7. Kale is taxed at 10% of the price excluding taxes. What is the tax rate relative to the price including tax ?