
First Midterm - Fall 2016

Instructions

- The use of a mobile phone, or any other means of communication, is forbidden.
- Give all the results with a **two decimals** precision.
- Write answers on a **separate** sheet of paper.

Section are independent and can be treated separately.

1 Waky waky, eggs & baky (5 points)

VAT rate is at 20%

1. Eggs are sold 2\$ without tax. What is their price with tax ?
2. Bacon is sold with tax at 4\$. What is the price without tax ?
3. The tax rate is lowered to 15%. By how much prices (with tax) will decrease ?
4. The price of bacon increased by 5% in 2014, by 10% in 2015 and by 2% in 2016. What is the annual average increase rate ?
5. The price of eggs is increasing at an annual regular pace of 5% a year. In how many years, will the price of eggs be multiplied by 5 ?

2 Alice & Bob in a cookie factory (8 points)

Alice and Bob have started to work as sales for a big cookie factory at 1200\$ per month in 2013.

1. Three years later, in 2016, Alice is now earning 20% more while Bob is earning 30% more. How lower is Alice's salary compared to Bob's (state the answer in % of Bob's salary) ?
2. By how much should Alice's salary increase to catch up Bob's salary ?
3. Inflation rate stood at 2% rate per year. By how much prices have increased between 2013 and 2016 ?
4. How does the purchasing power of Alice change between 2013 and 2016 ? What about Bob's ?

The monthly tax rate is progressive and as follow :

Income ranges			
0 - 500	500 - 1000	1000 - 1500	Above 1500
0%	5%	15 %	20 %

Table 1: Income tax rates

5. What is the amount of taxes paid by Alice in 2016 ? By Bob ?
6. What should be the flat tax-rate so that Alice pays the same amount of taxes ?

The distribution of wages inside the cookie factory is the following :

Wages	Frequencies
1200 - 1400	5
1400 - 1600	9
1600 - 1800	4
1800 - 2000	3

Table 2: Distribution of the wages in the cookie factory

7. What is the mode of the wage distribution ?
8. How are Alice and Bob income compared to the median worker ?

3 Inflation in Mas-a-Tierra, Chile (7 points)

An typical inhabitant of Mas-a-Tierra is consuming per year :

- 60% of greens
- 35% of fish
- 5% of oil

The table below gives the prices evolution during year 2013, 2014, 2015.

	Greens	Fish	Oil
2013	+5%	+2%	-3%
2014	+1%	+4%	2%
2015	+3%	+2%	4%

1. Compute elementary indexes for each year using 2012 as the baseline year.
2. What is the inflation rate from 2013 to 2015 ? (Use the Laspeyres index with 2012 as the baseline year).

3. What is the average annual inflation rate in Mas-a-Tierra between 2013 and 2015 ?

In a nearby island people consumes on average 100kg of greens a year, 40kg of fish and 6L of oil in 2012. In 2015, they consume 10% less fish and 15% more Greens. The prices between 2012 and 2015 were as follows :

	Greens (/kg)	Fish (/kg)	Oil (/L)
2012	2.9	10.3	1.1
2013	3	10	0.9
2014	3.2	10.5	1.1
2015	3.3	10.8	1.2

4. Compute the Laspeyres index in 2015 using 2012 as a baseline year.
5. Compute the Paasche index in 2015 using 2012 as a baseline year.

Mas-a-Tierra currency is Chilean Peso. The nominal exchange rate was 1\$ for 650 Chilean Pesos in 2013. US annual inflation rate had been the following between 2013 and 2015 1.5%, 0.8% and 0.7%.

6. What is the average annual inflation rate in the US between 2013 and 2015 ?
7. What should be the nominal exchange rate in 2015 so that the purchasing power parity holds in 2015 ?
