

Mock exam, quantitative methods in decision taking, CMT 2008

Choose 4 out of 6 exercises

Exercise 1 *A firm is using 2 raw materials in production. On the basis of prices and quantities of this 2 raw materials calculate the Lespeyers and Paasche price indexes for cost of production for this firm.*

Raw material prices	A	B	Raw material quantities	A	B
Time 1	100	200	Time 1	20	20
Time 2	150	130	Time 2	15	30

Exercise 2 *The quality control of some firm has determined that the probability of a product failure in a given year are the following:*

year	probability
1	0.1
2	0.1
3	0.2
4	0.4
>4	0.2

What is the probability that the product will not break in first 3 years? What is the probability that it will break in first two years? Given that the cost of repair is equal to 100\$ what is the expected cost of giving 3 year guarantee to product users?

Exercise 3 *A firm is considering the decision of insuring a factory it owns. Firm estimated the probability an accident in the factory at 1% and the cost of it at 100000\$. The insurance covering all the 80% of the cost of accident is offered at 1000\$. Calculate the expected value and variance of the accident costs and explain why the firm may choose to insure itself.*

Exercise 4 *Given chain index (month to the previous month) of prices of consumer goods in Poland for 2007 (inflation) was*

Month	Index
Feb	100.4
March	100.4
April	100.4
May	100.8

1. *Construct the moving average index for March and April (with $k = 2$)*
2. *Use the exponential smoothing (with $\alpha = 0.2$) to calculate smoothed index for last 2 months*
3. *Calculate inflation between February and May.*
4. *The average wage in May was 1500 zł. Deflate this wage into zlotys from February.*

Exercise 5 The survey in two countries related to the number of telephone calls made by households. The following data was collected from these samples:

	Country A	Country B
number of observation	900	400
mean	100	124
median	120	130
first quartile	30	40
third quartile	100	110
range	400	300
mean absolute deviation	80	60
variance	64	81
standard deviation	8	9
coefficient of variation	0.08	0.07

1. Interpret the numbers in the table.
2. Calculate the confidence 99 interval for number of calls in Country A ($z_{0.995} = 2.57$). Interpret the result.
3. The equality of the mean number of calls was tested and the p-value 0.08 was obtained. What this result implies?

Exercise 6 Some advertising firm estimated the regression model which is explaining the quantity sold of a product in a given week by the number of emissions of an advertisement. The regression results based on 100 observations are below:

	Coefficient	Standard deviation	t	p-value
Intercept	3	5	0.6	0.549
Number of emissions	10	2	5	0.000
R^2	0.40			

1. Give the interpretation to R^2
2. Interpret the p-value calculated for explanatory variable Number of emissions. .
3. Calculate what is the expected quantity sold for 10 emissions of the advertisement.