



ADMISSION EXAM  
VERSION C 5

Each question has only one correct answer  
Each correct answer = 3 points  
Duration of the exam = 90 minutes

*Grid 1.* Seasonal component of a time series:

- a) cannot be predicted
- b) describes the general increase of a time series
- c) explains the periodic patterns in a dataset
- d) Describes long terms pattern in a dataset

*Grid 2.* Which of the following statements regarding types of errors is true?

- a) Observation errors are greater in the case of a sample survey than in a complete observation.
- b) Random representativity errors are caused by the existence of nonresponses
- c) Systematic representativity errors can be caused by the existence of nonresponses
- d) The existence of an uncovered area in the sampling frame leads to greater observation errors

*Grid 3.* A stratified survey is to be conducted among the clients of a bakery products company in the South-West development region. The information needed for sampling is as follows:

| Stratum | Number of firms | Average turnover (billion Lei) | Variance |
|---------|-----------------|--------------------------------|----------|
| Urban   | 350             | 25                             | 16       |
| Rural   | 150             | 11                             | 25       |

The calculated sample size is 120 companies. Taking into account that the stratification was done according to the optimal allocation criterion, specify the sample size for each stratum.

- a) (84, 36)
- b) (72, 48)
- c) (78, 42)
- d) (48, 72)

*Grid 4.* Using a sample of 510 respondents, we estimated the following regression equation that explains the individuals' sleeping behaviour by gender:

$$\text{sleep} = 3840 - 0.2 \text{ work} - 11.9 \text{ educ} + 87 \text{ male}$$

(235.11)    (0.018)    (4.86)    (34.33)

The variables are: sleep (total minutes per week spent sleeping at night), work (total weekly minutes spent working), education (years of schooling), and male (a gender dummy). The critical vale for the t-statistic is 1.96 and the standard errors are below the regression coefficients.



Select the correct statement:

- a) Males sleep 87 minute more than women.
- b) Males sleep 87 % more than women.
- c) Males sleep 34 minutes more than women.
- d) Gender is not a significant variable in the econometric model.

**Grid 5.** If the value of the Pearson linear correlation coefficient for two linearly correlated variables is -0.6, then the coefficient of determination  $R^2$  has the value:

- a) 0.6
- b) 0
- c) 0.36
- d) 60

**Grid 6.** A researcher plans to group the data into classes. He has to compute:

- a) the mean
- b) the median
- c) the amplitude
- d) the variance

**Grid 7.** The following data is recorded across six weeks (t) for the number of the sold properties by a real estate company. In the last week the number of the sold properties was 10.

| t | Change in the sold properties compared to the first week |
|---|----------------------------------------------------------|
| 1 | 0                                                        |
| 2 | 2                                                        |
| 3 | 4                                                        |
| 4 | 3                                                        |
| 5 | -1                                                       |
| 6 | 3                                                        |

In the fifth week the mobile-base absolute change is:

- a) -4
- b) 4
- c) 0
- d) -2

**Grid 8.** Which of the following statements regarding data collection methods are true?

- a) In the case of a face-to-face interview, the questionnaire should be as short as possible to avoid partial nonresponses
- b) The telephone interview is considered an indirect method
- c) In the case of the online interview, the nonresponse rate is the lowest
- d) The case of face-to-face interviews, the cost per questionnaire is higher compared to other data collection methods



Grid 9. Efficient estimators:

- a) are positive
- b) have a large mean
- c) have the largest variance
- d) have the smallest variance

Grid 10. Using a sample of 250 respondents, it was estimated the following regression equation that explains the students' grades by gender:

$$\text{grade} = 6.743 + 0.5238 \text{ study\_time} - 1.05 \text{ male}$$

Select the correct statement:

- a) Males have on average higher grades than female students.
- b) Study time has a negative effect on grades.
- c) Females study more than males.
- d) Study time has a positive effect on grades.

Grid 11. Which of the following statements regarding the relationship between the crude birth rate and the general fertility rate is true?

- a) The crude birth rate is calculated as the product of the general fertility rate, the proportion of fertile women among all women, and the proportion of women in the total population
- b) The general fertility rate is calculated as the product of the crude birth rate, the proportion of fertile women among all women, and the proportion of women in the total population
- c) The general fertility rate is calculated as the product of age-specific fertility rates and the crude birth rate
- d) The crude birth rate is calculated as the sum of the age-specific fertility rates and the shares of women in each fertile age group

Grid 12. If in a frequency distribution we multiply the absolute frequencies  $k$  times:

- a) the arithmetic average does not change
- b) the median does not change
- c) the mean-value increases  $k$  times
- d) the mean decreases  $k$  times

Grid 13. For a time series, the trend was estimated using the analytical method, resulting in the following equation:  $\hat{Y}_t = 100 + 0.01 \cdot t$ . Indicate which of the following statements is correct:

- a) The series is stationary and follows an ARMA process
- b) The cyclical component is equal to 100
- c) The series shows an upward trend
- d) The seasonal component is 0.01



**Grid 14.** Which of the following statements regarding simple random sampling is true:

- a) The total variance of the chosen variable for sampling is used when calculating the sample size
- b) The average variance of variables for which we have information from administrative sources is used when calculating the sample size
- c) It is a recommended sampling design in the case of heterogeneous populations
- d) The units in the target population can only be individuals (not economic agents)

**Grid 15.** A large standard error of the estimators of regression coefficients, when used for testing the statistical significance of the coefficients:

- a) will lead to large computed t-statistic
- b) will lead to small computed t-statistic
- c) will lead to small critical t-statistic
- d) Are not related to the t-statistic

**Grid 16.** In a multiple linear regression model, the coefficients and p-values for the independent variables are:

| Variable | Coefficient | p-value |
|----------|-------------|---------|
| $X_1$    | 2.5         | 0.03    |
| $X_2$    | -1.2        | 0.15    |
| $X_3$    | 0.8         | 0.001   |

Which of the independent variables are significant at the 5% significance level?

- a)  $X_1$  and  $X_3$
- b)  $X_1$  and  $X_2$
- c)  $X_2$  and  $X_3$
- d) All variables are significant

**Grid 17.** On January 1st, 2024, the population of a locality was 203400 inhabitants, and on January 1st, 2025, it was 202500. During the year 2024, there were 2500 live births, and net migration was -250 persons. Based on this information, the crude death rate in 2024 was:

- a) 15.5 deaths per 1,000 inhabitants
- b) 12.3 deaths per 1,000 inhabitants
- c) 13.7 deaths per 1,000 inhabitants
- d) 17.4 deaths per 1,000 inhabitants

**Grid 18.** The following table shows some descriptives for sales and R&D expenditures of a sample of 95 firms:

|                    | Sales (thousands lei) | R&D expenditures |
|--------------------|-----------------------|------------------|
| Mean               | 350                   | 50               |
| Standard deviation | 30                    | 5                |



Select the correct statement:

- a) Variation of the two variables are equal
- b) Variation is larger for Sales
- c) Variation is larger for R&D expenditures
- d) Variations cannot be compared

**Grid 19.** Over five years, a team of statisticians completed 335 projects, as follows:

| Year               | 2020 | 2021 | 2022 | 2023 | 2024 |
|--------------------|------|------|------|------|------|
| Number of projects | 50   | 60   | 65   | 74   | 86   |

According to the data analysis, what was the average annual percentage change in the number of projects?

- a) 114.52%
- b) 9 projects
- c) +14.52%
- d) +31,14%

**Grid 20.** Which of the following statements regarding statistical surveys is true?

- a) It is a data collection method that saves time because partial information is collected from each unit in the population
- b) It is a data collection method that provides information about large populations without needing to observe all units
- c) It is an efficient method only if the questionnaire is applied online
- d) It is an exhaustive data collection method

**Grid 21.** For testing a regression model, the F-statistic is computed as:

- a)  $F = \text{Mean of Squares Explained} / \text{Mean of Squares Residuals}$
- b)  $F = \text{Mean of Squares Residuals} / \text{Mean of Squares Explained}$
- c)  $F = \text{Mean of Squares Residuals} / \text{Total sum of squares}$
- d)  $F = \text{Total sum of squares} / \text{Mean of Squares Residuals}$

**Grid 22.** For two statistical variables, a Pearson correlation coefficient of -0.12 was determined ( $r = -0.12$ ). It can be stated that:

- a) There is a direct relationship between the two variables
- b) There is a strong relationship between the two variables
- c) There is a weak relationship between the two variables
- d) The relationship between the two variables is of medium intensity

**Grid 23.** A population is considered demographically young if the share of the population aged 65 and over (gv) satisfies the following condition:

- a)  $gv > 12\%$
- b)  $7\% \leq gv \leq 12\%$
- c)  $gv < 7\%$
- d)  $gv > 20\%$



**Grid 24.** In the following data set [120, 180, 140, 160, 200, 220], the mean and median value are:

- a) 170 and 170
- b) 160 and 170
- c) 170 and 150
- d) 175 and 180

**Grid 25.** The following data was reported for two months by a company, related to two items from its portfolio:

| Item | Price (lei/item) |          | Quantity (no of items) |          |
|------|------------------|----------|------------------------|----------|
|      | June (0)         | July (1) | June (0)               | July (1) |
| A    | 25               | 28       | 53                     | 40       |
| B    | 85               | 100      | 125                    | 145      |

The Paasche Index for the total quantity is:

- a) 0.9781
- b) 1.3272
- c) 1.3752
- d) 1.1169

**Grid 26.** To characterize the relationships among employees of a company, a simple random sample without replacement was selected from a population of 850 employees, resulting in a sample of 190 individuals. The average rating (on a scale from 1 to 10) used to evaluate the direct supervisor was 7.4, with a standard deviation of 1.2 points. Estimate, with a 95% confidence level ( $z_{(1-\alpha/2)}=1.96$ ), the average rating given to the direct supervisor.

- a) (7.23 ; 7.57)
- b) (7.42 ; 7.68)
- c) (7.07 ; 7.73)
- d) (7.28 ; 7.52)

**Grid 27.** Using a sample of 510 respondents, we estimate the following regression equation that explains the individuals' sleeping behaviour by gender:

$$\text{sleep} = 3840 - 0.2 \text{ work} - 11.9 \text{ educ} + 87.75 \text{ male}$$

(235.11)   (0.018)            (4.86)            (34.33)

The variables are: sleep (total minutes per week spent sleeping at night), work (total weekly minutes spent working), education (years of schooling), and male (a gender dummy). The critical value for the t-statistic is 1.96 and the standard errors are below the regression coefficients.

Select the correct statement:

- a) Educated people sleep more than less educated people
- b) Education is a significant explanatory factor
- c) Education is not a significant explanatory factor
- d) None of the above



**Grid 28.** Following the estimation of a multiple linear regression model, the analysis of variance (ANOVA) produced a Fisher statistic value of 20.738 ( $F = 20.738$ ) with an associated probability of 0.000414 ( $p\text{-value} = 0.000414$ ). Based on this information, select the correct statement:

- a) The independent variables are not statistically valid
- b) The regression model shows homoscedasticity
- c) The regression model is statistically valid
- d) There is no information about the statistical validity of the regression model

**Grid 29.** If the female fertility curve reaches its peak in the 25–29 age group, the fertility type in that population is:

- a) Early
- b) Intermediate
- c) Late
- d) Mixed

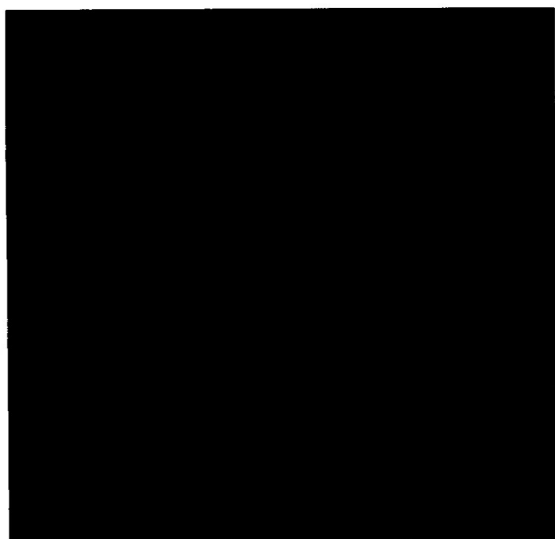
**Grid 30.** The number of hours allocated weekly to individual study for 160 students enrolled in the undergraduate program "Economic Statistics" is:

| Intervals (hours)  | 12-14 | 14- 16 | 16-18 | 18 -20 | 20-22 |
|--------------------|-------|--------|-------|--------|-------|
| Number of students | 25    | 30     | 55    | 30     | 25    |

The average number of hours allocated weekly to individual study and the variance are:

- a) 17.00 hours and 6.3
- b) 18.00 hours and 16.88 hours
- c) 6.3 hours and 17.00
- d) 17.00 hours and 2.51 hours



**Cod Grilă**

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**Disciplină**

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| Nr. | A                                | B                                | C                                | D                                | — |
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