

Quantitative Methods – Doporučená doba zpracování: 40 minut

1. The variance analysis of simple grouping is applied in hypothesis testing for equality of:

- a) two averages,
- b) more than two averages,
- c) two variances,
- d) more than two variances,
- e) none of the answers above is correct.

2 We are given a 15-member sample:

24.5	5.4	13.1	3.6	7.8	12.5	11.4	6.9
7.5	8.1	9.6	9.8	15.2	5.8	7.7	

The value of variation range is (rounded to 1 dec. p.)

- a) 5.1
- b) 19.1
- c) 20.9
- d) 51.4
- e) none of the answers above is correct

3. The significance level represents

- a) the error of the 1st kind,
- b) the error of the 2nd kind,
- c) the probability of the error of the 1st kind,
- d) the probability of the error of the 2nd kind,
- e) none of the answers above is correct.

4. For assessment of independence of two alternative properties the χ^2 -test of independence has been applied, giving the resulting test criterion value $\chi^2 = 5.26$. The critical values are $\chi^2_{0.05(1)} = 3.841$ and $\chi^2_{0.01(1)} = 6.635$.

The decision :

- a) the null hypothesis of independence can be rejected at $\alpha = 0.01$ significance level, it cannot be rejected at $\alpha = 0.05$ significance level;

- b) the null hypothesis of independence can be rejected at $\alpha = 0.05$ significance level, it cannot be rejected at $\alpha = 0.01$ significance level;
- c) the null hypothesis of independence cannot be rejected at any of the significance levels given;
- d) we reject the null hypothesis of independence at the $\alpha = 0.05$ significance level, as well as at the $\alpha = 0.01$ significance level;
- e) none of the answers above is correct.

5. Incidence of an extreme value in the sample does not affect the value of the :

- a) arithmetic average,
- b) variance,
- c) median,
- d) standard deviation,
- e) none of the answers above is correct.

6. The „ 3σ “ rule is connected to the :

- a) normal distribution,
- b) exponential distribution,
- c) hypergeometric distribution,
- d) uniform distribution,
- e) none of the answers above is correct.

7. A partial regression coefficient can assume values from :

- a) the interval $\langle 0 ; 1 \rangle$
- b) the interval $(0 ; 1)$
- c) the interval $\langle -1 ; +1 \rangle$
- d) the interval $(-\infty ; +\infty)$
- e) none of the answers above is correct

8. Relationship of the turnover Y (CZK th. per staffmember) upon the number of staff X has been described by the regression straight line $y' = 842 + 115x$. If the number of staff is reduced by 2, then the turnover per one staffmember at average will:

- a) fall by 612 CZK th.,
- b) rise by 1.072 CZK th.,
- c) fall by 230 CZK th.,
- d) rise by 230 CZK th.,
- e) none of the answers above is correct.

9. When two dice are cast, what is the probability of six falling just on one of the two dice :

- a) 1/36
- b) 10/36
- c) 11/36
- d) 25/36
- e) none of the answers above is correct

10. Among the distributions of a discrete random variable does not belong :

- a) the Poisson distribution,
- b) the geometric distribution,
- c) the exponential distribution,
- d) the binomial distribution,
- e) none of the answers above is correct.

11. Using a proper measure assess the variation of production during months of the year in three enterprises, if you know:

Enter prise	Production (units)	Arithm. average (monthly)	Variance
A	CZK	480	1764
B	No of orders	240	121
C	tons	120	324

Ordering of the enterprises by variation (ascendingly, from the lowest to the highest) :

- a) A, B, C
- b) A, C, B
- c) B, C, A
- d) C, A, B

e) none of the answers above is correct

12. The horizon distance of time series predictions is:

- a) unlimited,
- b) at least 1/4 of the time series reference period,
- c) at most 1/3 of the time series reference period,
- d) double time series reference period,
- e) none of the answers above is correct.

13. A correlation coefficient $r = -0.94$ has been obtained for relationship of the Y variable upon the X variable in the linear regression equation. The linear relationship thus can be assessed as:

- a) very weak,
- b) very strong,
- c) weak,
- d) medium,
- e) none of the answers above is correct.

14. Suppose the following simplex table:

	8	5	0	0	0	b
C _B B	x ₁	x ₂	x ₃	x ₄	x ₅	
	1	1	1	0	0	100
	1	0	0	1	0	40
	5	10	0	0	1	750
Z _i -C _j						

Calculate the test for optimality:

- a) 8;5;0;0;0
- b) -8;-5;0;0;0
- c) -5;0;0;8;0
- d) 0;0;0;0;0
- e) none of the answers above is correct.

15. Simple transportation problem has 4 suppliers, 5 destinations, total supply is 500 t and total demand is 450 t. Number of basic variables is

- a) 4
- b) 5
- c) 9
- d) 10

e) none of the answers above is correct.

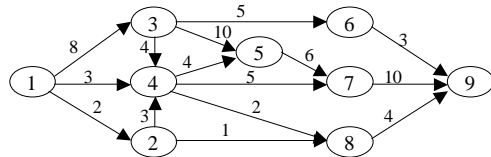
16. Variant that is best in all criteria is called

- a) Dominated alternative
- b) Ideal alternative
- c) Nadir alternative
- d) Feasible alternative
- e) none of the answers above is correct.

17. The method for solution of the multiple optimization problem is

- a) Jordanian method
- b) Goal programming
- c) MODI method
- d) CPM method
- e) none of the answers above is correct.

18. The project is described by the following PERT chart (activity on arc).



Arc evaluation represents the task duration. Which of the following tasks is critical task:

- a) 3-4
- b) 4-5
- c) 3-5

d) 4-7

e) none of the answers above is correct.

19. The game of two rational players X and

Y with pay-off matrix $\begin{pmatrix} 1 & -1 & 0 & 2 \\ -1 & 2 & 1 & -1 \\ 0 & 3 & 4 & 5 \end{pmatrix}$

- a) has only one saddle point
- b) has three saddle points
- c) has two saddle points
- d) has no saddle points
- e) none of the answers above is correct.

20. Suppose the following Input-Output

table

	O1	O2	CP
O1	10	20	40
O2	5		10
P1	8	3	

. Total output in

both sectors is

- a) 0 and 0
- b) 8 and 3
- c) 40 and 10
- d) 10 and 5
- e) none of the answers above is correct.