

Mathematics 1 – Recommended Time of Processing: 45 minutes

- 1) Within a geometric sequence is  $a_n = \frac{1}{2}$ ,  $a_{n+1} = 4$ .  
Establish the  $a_{n-1}$  member of the sequence :
- 16
  - $\frac{1}{8}$
  - $\frac{1}{16}$
  - 8
  - none of the given answers is correct
- 2) The total of roots of the equation  $|x - 10| = 4 + 2x$  is equal to the number:
- 12
  - 12
  - 2
  - 14
  - none of the given answers is correct
- 3) Graph of the function  $y = 4^x - 2$  crosses the axes of coordinates:
- the x axe in one points
  - the x axe in two points
  - the y axe in two points
  - no crossing of y axe
  - none of the given answers is correct
- 4) Out of n partakers of a lottery 4 are to be drawn as winners. How many ways are there to obtain them:
- $n^4$
  - $4n$
  - $4n!$
  - $\frac{n!}{(n-4)!}$
  - none of the given answers is correct
- 5) Establish the quadratic equation with real coefficients, if you know that one root of equation is the complex number  $x_1 = 1 + i$ :
- $x^2 + 2x + 2 = 0$
  - $x^2 - 2x - 2 = 0$
  - $x^2 + 2x - 2 = 0$
  - $x^2 - 2x + 2 = 0$
  - none of the given answers is correct
- 6) The definition domain of the function  $y = \frac{\ln x}{-x^2 - 2x + 3}$  is the set:
- $(0; 1) \cup (1; +\infty)$
  - $(-\infty; -3) \cup (1; +\infty)$
  - $(0; 1) \cup \langle 1; +\infty$
  - $(-3; 1)$
  - none of the given answers is correct
- 7) After a treatment  $\frac{(n+1)!}{n!} - \frac{n!}{(n-1)!}$  expression we receive the following (for  $n > 1$ ):
- 1
  - 1
  - $n!$
  - $(n-1)!$
  - none of the given answers is correct
- 8) For what values of the m parameter the equation  $x^2 + (m+2)x + m + 2 = 0$  does not have real roots:
- $m > 2$
  - $m = -2$
  - $m < 2$
  - $m \in (-2, 2)$
  - none of the given answers is correct
- 9) The distance of two parallels  $p_1: x - y + 7 = 0$ ,  $p_2: x - y - 1 = 0$  equals the number:
- $2\sqrt{2}$
  - $4\sqrt{2}$
  - 6
  - 8
  - none of the given answers is correct
- 10) The set of all x values, within which the function  $y = \frac{x-2}{x+3}$  assumes the values from the  $\langle 1, +\infty$  interval, is the set:
- $\mathbb{R}$
  - $\mathbb{R} - \{-3\}$
  - $(3, +\infty)$
  - $(-\infty, 3)$
  - none of the given answers is correct

- 11) If a radius of a ball is expanded by 50%, its surface will be expanded by:
- 50%
  - 100%
  - 225%
  - 125%
  - none of the given answers is correct
- 12) Negation of a statement „At least two spectators were satisfied“ reads:
- Just one spectator was satisfied.
  - More than two spectators were satisfied.
  - At least one spectator was satisfied.
  - At most one spectator was satisfied
  - none of the given answers is correct
- 13) What is the mutual position of two straight lines  $p: x + 2y - 3 = 0$ ,  $q: x = -1 + 2t, y = 2 - t$ ? The straight lines are:
- identical
  - parallel, but not identical
  - mutually perpendicular
  - divergent, but not perpendicular
  - none of the given answers is correct
- 14) The set of all real solutions of the inequality  $\sqrt{x-4} < \sqrt{x+1}$  is the set:
- $\emptyset$
  - $\langle -1, +\infty \rangle$
  - $\langle 4, +\infty \rangle$
  - $\mathbb{R}$
  - none of the given answers is correct
- 15) If  $\sin x = -1$  and  $x \in (0, 2\pi)$ , then:
- $\operatorname{tg} x$  is not defined
  - $\operatorname{tg} x = \frac{\sqrt{3}}{3}$
  - $\operatorname{tg} x = -\sqrt{3}$
  - $\operatorname{tg} x = -1$
  - none of the given answers is correct
- 16) The expression  $\frac{\sqrt{x} \cdot \sqrt[3]{x}}{\sqrt{x} \cdot \sqrt[3]{x}}$  is for every  $x > 0$  equal to:
- 1
  - $\sqrt[6]{x}$
  - $\sqrt[3]{x^2}$
  - $\sqrt{x^3}$
  - none of the given answers is correct
- 17) The conic section described by the equation  $x^2 - 4y^2 + 6x + 5 = 0$  has eccentricity :
- 5
  - 3
  - $\sqrt{5}$
  - $\sqrt{3}$
  - none of the given answers is correct
- 18) The equation  $\log_3 27x + \log_3 x^2 = 15$  has one only root in  $\mathbb{R}$ , that is situated in the interval:
- (71, 83)
  - (49, 57)
  - (27, 50)
  - (3, 15)
  - none of the given answers is correct
- 19) The set of all the  $\frac{x}{x-1} > 1$  inequality solutions is the set:
- $(-\infty, 1)$
  - $(1, +\infty)$
  - $(-\infty, 1)$
  - $(-\infty, 1) \cup (1, +\infty)$
  - none of the given answers is correct
- 20) The focus of the parabola  $y^2 - 6x + 4y + 4 = 0$  is located relative to the directrix straight line:
- to the left
  - to the right
  - below
  - above
  - none of the given answers is correct

## Řešení

<b>1</b>	C
<b>2</b>	C
<b>3</b>	A
<b>4</b>	E
<b>5</b>	D
<b>6</b>	A
<b>7</b>	A
<b>8</b>	D
<b>9</b>	B
<b>10</b>	E
<b>11</b>	D
<b>12</b>	D
<b>13</b>	A
<b>14</b>	C
<b>15</b>	A
<b>16</b>	B
<b>17</b>	C
<b>18</b>	A
<b>19</b>	B
<b>20</b>	B