

## Домашнее задание

1.  $3^{x^2+4x} = \frac{1}{25}$   $x = -2 \pm \sqrt{4 - 2 \log_3 5}$
2.  $5^{|4x-6|} = 25^{3x-4}$   $x = \frac{7}{5}$
3.  $\left(\frac{1}{4}\right)^{\frac{4-x^2}{2}} = 8^x$   $\{-1, 4\}$
4.  $\sqrt{5-x} \cdot \left(3^{x^2-7,2x+3,9} - 9\sqrt{3}\right) = 0$   $\left\{\frac{1}{5}, 5\right\}$
5.  $2^x \cdot 5^x = 0,1 \cdot \left(10^{x-1}\right)^5$   $x = 1,5$
6.  $18^{2x} \cdot 2^{-2x} \cdot 3^{x+1} = 3^{x-1}$   $x = -0,5$
7.  $(0,6)^x \cdot \left(\frac{25}{9}\right)^{x^2-12} = \left(\frac{27}{125}\right)^3$   $\left\{-\frac{5}{2}, 3\right\}$
8.  $\left(\frac{5}{3}\right)^{x+1} \cdot \left(\frac{9}{25}\right)^{x^2+2x-11} = \left(\frac{5}{3}\right)^9$   $\left\{-\frac{7}{2}, 2\right\}$
9.  $\frac{4}{5} \cdot 5^{x^2+1} = 10^{1-\lg \operatorname{tg} \frac{\pi}{4}} + 25^{0,5 \log_5 10}$   $x = \pm 1$
10.  $2^{\sqrt{x+1}} = 16 \sqrt{(0,25)^{5-\frac{x}{4}}}$   $x = 24$
11.  $32^{\left(\frac{x+5}{x-7}\right)} = 0,25 \cdot 128^{\left(\frac{x+17}{x-3}\right)}$   $x = 10$
12.  $\frac{2}{3} \cdot 3^{\sqrt{\left(\frac{8}{27}\right)^{\frac{5}{x}}}} = \left(\frac{9}{4}\right)^{-4}$   $x = \frac{5}{7}$
13.  $\sqrt[3]{27^{2x-1}} = \sqrt{9^{2x-1}}$   $x = 3$
14.  $10^{\frac{\sqrt{5x}-\sqrt{5x+1}}{\sqrt{5x-1}}} = 1000\sqrt{10}$   $\left\{\frac{1}{20}, 5\right\}$
15.  $\sqrt{3} \cdot 3^{\frac{x}{1+\sqrt{x}}} \cdot \left(\frac{1}{3}\right)^{\frac{2+\sqrt{x+x}}{2(1+\sqrt{x})}} = 81$   $x = 81$
16.  $8^{\left(\frac{x-3}{3x-7}\right)} \cdot \sqrt[3]{\sqrt{(0,25)^{\left(\frac{3x-1}{x-1}\right)}}} = 1$   $x = \frac{5}{3}$
17.  $5^x \cdot 8^{x+1} = 100$   $\left\{-\frac{1}{\lg 5}, 2\right\}$
18.  $7^{x-1} - 6^{2-2x} = 0$   $x = 1$
19.  $2,5 \cdot 4^x = 8 \cdot 5^{x-1}$
20.  $\sqrt[3]{2^{2x+8}} = 152 \cdot 19^{2x-2}$
21.  $3 \cdot \sqrt{1,5} \cdot 3^{x-1} = 2^{3x+1}$

22.  $3 \cdot 4^x + \frac{1}{3} \cdot 9^{x+2} = 6 \cdot 4^{x+1} - \frac{1}{2} \cdot 9^{x+1}$   $x = -0,5$
23.  $5^{x-4} - 5^{x-5} = 2 \cdot 5^{x-6} + 2 \cdot 3^{x-4}$   $x = 6$
24.  $9^x - 2^{x+0,5} = 2^{x+3,5} - 3^{2x-1}$   $x = 1,5$
25.  $2^{2x+8} + 5^{2x+7} + 2^{2x+10} - 5^{2x+8} = 0$
26.  $3 \cdot 5^{-(2x+2)} - 2^{2-2x} + 5^{-(2x+1)} - 2^{-2x} = 0$
27.  $3^{x+1} + \left(\frac{1}{3}\right)^{1-x} - \sqrt{9^{x-2}} - \frac{1}{\sqrt{9^{3-x}}} = 258$
28.  $2^{-(x+4)} - \sqrt{\frac{1}{4^{x+5}}} = 72 - \left(\frac{1}{2}\right)^{x+2}$
29.  $\left(\frac{1}{3}\right)^{2-x} + 3^{x-3} = 99 + \sqrt{\left(\frac{1}{9}\right)^{4-x}}$   $x = 6$
30.  $\sqrt{3^{x-54}} - 7\sqrt{3^{x-58}} = 162$   $x = 66$
31.  $\left(\frac{2}{7}\right)^{\log_x 4} = \frac{x}{14}$   $\left\{2, \frac{2}{7}\right\}$
32.  $\left(\frac{2}{5}\right)^{\log_x \left(\frac{5}{7}\right)} = \frac{7}{2x}$
33.  $25^x + 175 \cdot 5^{x-2} - 60 = 0$
34.  $\sqrt{6^{x+2}} - 2 = 8 - 36 \cdot 6^x$
35.  $\sqrt{2^{x+1}} - 7 = 9 - 2 \cdot 2^x$
36.  $4^{2x-3} - 3 \cdot 4^{x-2} - 1 = 0$   $x = 2$
37.  $4^{3x^2+x} - 8 = 2 \cdot 8^{x^2+\frac{x}{3}}$   $\left\{-1, \frac{2}{3}\right\}$
38.  $2^{4(x+1)^2} = \frac{1}{2} + 2 \cdot 4^{x(x+2)}$   $x = -1$
39.  $64^{\frac{1}{x}} - 2^{3+\frac{3}{x}} + 12 = 0$   $\{3, \log_6 8\}$
40.  $9^{1-(x-1)^2} - 12 \cdot 3^{-(x-1)^2} + 1 = 0$   $x = 1 \pm \sqrt{1 - \log_3(2 - \sqrt{3})}$
41.  $5^{2+\cos 2x} - 26 \cdot 5^{\cos^2 x} + 5 = 0$   $x = \pi k, k \in \mathbb{Z}$
42.  $4^{\sqrt{x^2-2}+x} - 5 \cdot 2^{x-1+\sqrt{x^2-2}} = 6$   $x = 1,5$
43.  $6 \cdot (0,75)^{2-2x-x^2} - (0,75)^{x^2+2x-2} = 25^{\log_{125} 8} - 3$   $x = -1 \pm \sqrt{3 + \log_{0,75} 2}$
44.  $\frac{9}{2^{x-2}} = \frac{10+4^{\frac{x}{2}}}{4}$
45.  $4 \cdot 2^{2x} - 6^x = 18 \cdot 3^{2x}$   $x = -2$

$$46. 5 \cdot 25^{\frac{1}{x}} + 3 \cdot 10^{\frac{1}{x}} = 2 \cdot 4^{\frac{1}{x}}$$

$$47. 9 \cdot 5^{\frac{2}{\sqrt{x}}} + 2 \cdot 15^{\frac{1}{\sqrt{x}}} - 75 \cdot 3^{\frac{2}{\sqrt{x}}} = 0$$

$$48. 4^{x^2} + 6^{x^2} = 2 \cdot 9^{x^2}$$

$$49. 5 \cdot 9^{\sqrt{x+2}} + 22 \cdot 15^{\sqrt{x+2}} - 15 \cdot 25^{\sqrt{x+2}} = 0$$

$$50. 8^x + 18^x = 2 \cdot 27^x \quad x=0$$

$$51. \frac{2 \cdot 6^x - 4^x - 15}{6^x - 9^x - 5} = 3$$

$$52. 3^{2x^2+6x-9} + 4 \cdot 15^{x^2+3x-5} = 3 \cdot 5^{2x^2+6x-9} \quad \{-4, 1\}$$

$$53. (4 + \sqrt{15})^x + (4 - \sqrt{15})^x = 62 \quad x = \pm 2$$

$$54. \left(\sqrt{7+4\sqrt{3}}\right)^{\cos x} + \left(\sqrt{7-4\sqrt{3}}\right)^{\cos x} = \frac{5}{2} \quad x = \pm \arccos(\log_{2+\sqrt{3}} 2) + \pi k$$

$$55. 8 \cdot 4^{\frac{1}{x}} + 8 \cdot 4^{-\frac{1}{x}} - 54 \cdot 2^{\frac{1}{x}} - 54 \cdot 2^{-\frac{1}{x}} = -101 \quad \left\{\pm \frac{1}{2}, \pm 1\right\}$$

$$56. 5^{3x} + 9 \cdot 5^x + 27(5^{-3x} + 5^{-x}) = 64 \quad \{0, \log_5 3\}$$

$$57. 3^{2x+1} = 3^{x+2} + \sqrt{1-6 \cdot 3^x} + 3^{2(x+1)} \quad x = \log_3(6 + \sqrt{33}) - 1$$

$$58. \sqrt{\left(\frac{2}{3}\right)^{\frac{6}{x}}} - \sqrt{\left(\frac{3}{2}\right)^{\frac{6}{x}}} - \sqrt{\left(\frac{2}{3}\right)^{\frac{2}{x}}} + \sqrt{\left(\frac{3}{2}\right)^{\frac{2}{x}}} = 3 \quad x = \frac{\lg 2 - \lg 3}{\lg(\sqrt{5} + 1) - \lg 2}$$

$$59. 10^{(x+1)(3x+4)} - 2 \cdot 10^{(x+1)(x+2)} = 10^{1-x-x^2} \quad x = -1 \pm \sqrt{\frac{1}{2} \lg(1 + \sqrt{11})}$$

$$60. \sqrt{x} \left( 9^{\sqrt{x^2-3}} - 3^{\sqrt{x^2-3}} \right) = 3^{2\sqrt{x^2-3}+1} - 3^{\sqrt{x^2-3}+1} + 6\sqrt{x} - 18$$

$$61. 3^{x-1} + 5^{x-1} = 34 \quad x = 3$$

$$62. 5^{\sqrt{x}} + 12^{\sqrt{x}} = 13^{\sqrt{x}} \quad x = 4$$

$$63. 3^{x^2} + 4^{x^2} = 5^{x^2} \quad x = \pm \sqrt{2}$$

$$64. \left(\sqrt{4-\sqrt{15}}\right)^x + \left(\sqrt{4+\sqrt{15}}\right)^x = (2\sqrt{2})^x \quad x = 2$$

$$65. 2^{3x^2-2x^3} = \frac{x^2+1}{x} \quad x = 1$$

$$66. (x+1) \cdot 9^{x-3} + 4x \cdot 3^{x-3} - 16 = 0 \quad x = 3$$

$$67. x^2 - x + 1 = 2^x - 4^{x-1} \quad x = 1$$