Домашнее задание

1. $\left(x^2-4\right)\sqrt{x+1}=0$	$\{-1,\ 2\}$
2. $\left(9-x^2\right)\sqrt{2-x}=0$	$\{-3,\ 2\}$
3. $\dfrac{3x^2-19x+20}{\sqrt{9x^2-24x+16}}=0$	$x=5$
4. $\dfrac{\left(x^2-1\right)(x+3)}{\sqrt{x^2-7x-8}}=0$	$x=-3$
5. $\sqrt{7-x}=x-1$	$x=3$
6. $21+\sqrt{2x-7}=x$	$x=28$
7. $2\sqrt{x+5}=x+2$	$x=4$
8. $\left\lvert\sqrt{x-2}-3\right\rvert+\sqrt{x-2}+x-\lvert 3-x\rvert-6=0$	$[3,\ 11]$
9. $\sqrt{6-4x-x^2}=x+4$	$x=-1$
10. $\sqrt{1+4x-x^2}=x-1$	$x=3$
11. $(x+1)\sqrt{16x+17}=(x+1)(8x-23)$	$\{-1,\ 4\}$
12. $\sqrt{2+\sqrt{6}-\left(6\sqrt{2}-2\sqrt{3}\right)x}=2x-\sqrt{2}$	$x=\dfrac{\sqrt{3}}{2}$
13. $\dfrac{1+\sqrt{2x+1}}{x}=1$	$x=4$
14. $\dfrac{\sqrt{13-x^2}}{x+1}=1$	$x=2$
15. $\dfrac{\sqrt{6-x-x^2}}{2x-5}=\dfrac{\sqrt{6-x-x^2}}{x-2}$	$x=-3$
16. $\sqrt{9-5x}=\sqrt{3-x}+\dfrac{6}{\sqrt{3-x}}$	$x=-3$
17. $\dfrac{4}{x+\sqrt{x^2+x}}-\dfrac{1}{x-\sqrt{x^2+x}}=\dfrac{3}{x}$	$\left\{-1,\ \dfrac{9}{16}\right\}$
18. $\dfrac{2+x}{\sqrt{2}+\sqrt{2+x}}+\dfrac{2-x}{\sqrt{2}-\sqrt{2+x}}=2\sqrt{2}$	$\left\{-2,\ 1+\sqrt{5}\right\}$
19. $13x-3x^2-\dfrac{x}{\sqrt{x-1}}-\dfrac{\lvert 4-x\rvert}{\sqrt{x-1}}+\lvert 4-x\rvert=3x\lvert 4-x\rvert-\dfrac{4}{\sqrt{x-1}}+4$	$(1,\ 4]$
20. $\sqrt{3x+1}-\sqrt{x+4}=1$	$x=5$
21. $\sqrt{2x+5}=8-\sqrt{x-1}$	$x=10$
22. $\sqrt{10+x}-\sqrt{19-3x}=3$	$x=6$
23. $\sqrt{x+3}+\sqrt{2x-1}=4$	$x=52-8\sqrt{39}$
24. $\sqrt{1+x\sqrt{x^2+24}}=x+1$	$\{0,5\}$
25. $\sqrt{x^2-1}=(x+5)\sqrt{\dfrac{x+1}{x-1}}$	$\{-2,\ -1\}$
26. $\sqrt{2x^2+8x+6}+\sqrt{x^2-1}=2x+2$	$x=\pm 1$

27. $\sqrt{x-\sqrt{x-2}}+\sqrt{x+\sqrt{x-2}}=2\sqrt{2}$ $x=2$

28. $\dfrac{\sqrt{21+x}+\sqrt{21-x}}{\sqrt{21+x}-\sqrt{21-x}}=\dfrac{21}{x}$ $x=\pm 21$

29. $\dfrac{\sqrt{x+7}}{\sqrt{x+2}}=\dfrac{3\sqrt{x-1}}{\sqrt{3x-2}}$ $x=2$

30. $\dfrac{\sqrt[7]{12+x}}{x}+\dfrac{\sqrt[7]{12+x}}{12}=\dfrac{64}{3}\sqrt[7]{x}$ $\left\{-\dfrac{12}{129},\ \dfrac{12}{127}\right\}$

31. $\dfrac{1}{\sqrt{3x+10}}+\dfrac{6}{\sqrt{(x+2)(3x+10)}}=\dfrac{1}{\sqrt{x+2}}$ $x=62$

32. $\sqrt{2x+5}+\sqrt{5x+6}=\sqrt{12x+25}$ $x=2$

33. $\sqrt{x+5}+\sqrt{2x-7}=2\sqrt{x}$ $x=4$

34. $\sqrt{x+3}-1=\sqrt{x-\sqrt{x-2}}$ $\left\{\dfrac{22}{9},\ 6\right\}$

35. $\sqrt{x+3}-\sqrt{2x-1}-\sqrt{3x-2}=0$ $x=1$

36. $\sqrt{8x+1}+\sqrt{3x-5}=\sqrt{7x+4}+\sqrt{2x-2}$ $x=3$

37. $\sqrt{4x^2+9x+5}-\sqrt{2x^2+x-1}=\sqrt{x^2-1}$ $\{-1,\ 5\}$

38. $\sqrt{2x^2-9x+4}+3\sqrt{2x-1}=\sqrt{2x^2+21x-11}$ $\left\{\dfrac{1}{2},\ 5\right\}$

39. $\sqrt{5-\sqrt{x+1+\sqrt{2x^2+x+3}}}=1$ $\{-37,\ 6\}$

40. $2x^2=x+16+2x\sqrt{x^2-x}$ $x=-\dfrac{16}{9}$

41. $2x\sqrt{x^2+x}+2x^2+x=1$ $\left\{-1,\ \dfrac{1}{3}\right\}$

42. $\sqrt{x^3+4x-1-8\sqrt{x^4-x}}=\sqrt{x^3-1}+2\sqrt{x}$ $x=1$

43. $\sqrt[3]{12-x}+\sqrt[3]{14+x}=2$ $\{-15,\ 13\}$

44. $\sqrt[3]{8x+4}-\sqrt[3]{8x-4}=2$ $x=\pm\dfrac{1}{2}$

45. $\sqrt[3]{x+1}+\sqrt[3]{x+2}+\sqrt[3]{x+3}=0$ $x=-2$

46. $\sqrt[3]{x^2-7x+10}+\sqrt[3]{x^2-9x-36}=\sqrt[3]{2x^2-16x-26}$ $\{-3,\ 2,\ 5,\ 12,\ 4\pm\sqrt{29}\}$?

47. $\sqrt{x^2+x+4}+\sqrt{x^2+x+1}=\sqrt{2x^2+2x+9}$ $\{-1,\ 0\}$

48. $2x^2+\sqrt{2x^2-4x+12}=4x+8$ $x=1\pm\sqrt{3}$

49. $x^2+\sqrt{x^2+2x+8}=12-2x$ $\{-4,\ 2\}$

50. $3x^2+15x+2\sqrt{x^2+5x+1}=2$ $\{-5,\ 0\}$

51. $\dfrac{\sqrt{x^2+8x}}{\sqrt{x+1}}+\sqrt{x+7}=\dfrac{7}{\sqrt{x+1}}$ $x=1$

52. $\dfrac{4}{\sqrt[3]{x}+2}+\dfrac{\sqrt[3]{x}+3}{5}=2$ $\{8,\ 27\}$

53. $\sqrt{2-x}+\dfrac{4}{\sqrt{2-x}+3}=2$ $x=1$

54. $\dfrac{x-4}{\sqrt{x}+2}=x-8$ $x=9$

55. $x^2-4x+32=16\sqrt{x}$ $x=4$

56. $\dfrac{\sqrt[3]{x^4}-1}{\sqrt[3]{x^2}-1}-\dfrac{\sqrt[3]{x^2}-1}{\sqrt[3]{x}+1}=4$ $x=8$

57. $\sqrt{\dfrac{20+x}{x}}+\sqrt{\dfrac{20-x}{x}}=\sqrt{6}$ $x=12$

58. $\sqrt{\dfrac{2x+1}{x-1}}-2\sqrt{\dfrac{x-1}{2x+1}}=1$ $x=\dfrac{5}{2}$

59. $\dfrac{x}{x+1}-2\sqrt{\dfrac{x+1}{x}}=3$ $x=-\dfrac{4}{3}$

60. $\dfrac{3(x-2)+4\sqrt{2x^2-3x+1}}{2(x^2-1)}=1$ $\left\{\dfrac{3\pm\sqrt{73}}{4},\ 0,\ \dfrac{3}{2}\right\}$

61. $(x-3)^2+3x-22=\sqrt{x^2-3x+7}$ $\{-3,\ 6\}$

62. $\sqrt{3x^2+6x+16}+\sqrt{x^2+2x}=2\sqrt{x^2+2x+4}$ $\{-2,\ 0\}$

63. $\sqrt{x\sqrt[5]{x}}-\sqrt[5]{x\sqrt{x}}=56$ $x=1024$

64. $\sqrt[3]{24+\sqrt{x}}-\sqrt[3]{5+\sqrt{x}}=1$ $x=9$

65. $\sqrt[3]{9-\sqrt{x+1}}+\sqrt[3]{7+\sqrt{x+1}}=4$ $x=0$

66. $(x-3)(x+1)+3(x-3)\sqrt{\dfrac{x+1}{x-3}}-28=0$ $\left\{1-\sqrt{53},\ 1+2\sqrt{5}\right\}$

67. $\dfrac{3+x}{3x}=\sqrt{\dfrac{1}{9}+\dfrac{1}{x}\sqrt{\dfrac{4}{9}+\dfrac{2}{x^2}}}$ $x=\dfrac{3}{4}$

68. $8x-\dfrac{9}{x}=3\sqrt{8x+\dfrac{9}{x}+22}$ $\left\{-\dfrac{3}{4},\ 3\right\}$

69. $7x-\dfrac{4}{x}=-3\sqrt{7x+\dfrac{4}{x}}$? $x=\dfrac{2}{7}$

70. $\sqrt{12-\dfrac{12}{x^2}}+\sqrt{x^2-\dfrac{12}{x^2}}=x^2$ $x=\pm 2$

71. $\dfrac{1}{x}+\dfrac{1}{\sqrt{1-x^2}}=\dfrac{35}{12}$ $\left\{\dfrac{-5+\sqrt{73}}{14},\ \dfrac{3}{5},\ \dfrac{4}{5}\right\}$?

72. $\sqrt[3]{x+1}-\sqrt[3]{x-1}=\sqrt[6]{x^2-1}$ (однородное уравнение) $x=\pm\dfrac{\sqrt{5}}{2}$

73. $\sqrt{x-\dfrac{1}{x}}-\sqrt{1-\dfrac{1}{x}}=\dfrac{x-1}{x}$ (система уравнений) $\left\{1,\ \dfrac{1+\sqrt{5}}{2}\right\}$

74. $\sqrt{x-2}+\sqrt{4-x}=x^2-6x+11$ (система уравнений) $x=3$

75. $\sqrt[4]{47-2x}+\sqrt[4]{35+2x}=4$ (система уравнений) $\{-17,\ 23\}$

76. $\sqrt{2x+3}+\sqrt{x+1}=3x+2\sqrt{2x^2+5x+3}-16$ (система уравнений)

77. $\dfrac{\sqrt{x+4}+\sqrt{x-4}}{2}=x+\sqrt{x^2-16}-6$ (система уравнений) $x=5$?

78. $\dfrac{(34-x)\sqrt[3]{x+1}-(x+1)\sqrt[3]{34-x}}{\sqrt[3]{34-x}-\sqrt[3]{x+1}}=30$ (система уравнений) $\{7,\ 26\}$

79. $\sqrt[3]{(2-x)^2}+\sqrt[3]{(7+x)^2}-\sqrt[3]{(2-x)(7+x)}=3$ (система уравнений) $\{-6,\ 1\}$

80. $\sqrt{\dfrac{\sqrt{x^2+66^2}+x}{x}}-\sqrt{x\sqrt{x^2+66^2}-x^2}=5$ (система уравнений) $x=\dfrac{6}{\sqrt{119}}$?

81. $\sqrt[3]{4-4x+x^2}+\sqrt[3]{49+14x+x^2}=3+\sqrt[3]{14-5x-x^2}$ (система уравнений) $\{-6,\ 1\}$

82. $x^3+1=2\sqrt[3]{2x-1}$ (взаимно-обратные функции) $x=\dfrac{-1\pm\sqrt{5}}{2},\quad x=1$

83. $\sqrt{x^2+2x+1}-\sqrt{x^2-4x+4}=3$ $[2,+\infty)$

84. $\sqrt{x^2+6x+9}+\sqrt{x^2+2x+1}=7$ $\left\{-\dfrac{11}{2},\ \dfrac{3}{2}\right\}$

85. $\sqrt{10+x+6\sqrt{x+1}}+\sqrt{5-x+2\sqrt{4-x}}=7$ $\{0,\ 3\}$

86. $\sqrt{x^2+2\sqrt{x^2-1}}-\sqrt{x^2-2\sqrt{x^2-1}}=1$ $x=\pm\dfrac{\sqrt{5}}{2}$

87. $\sqrt{x-2+\sqrt{2x-5}}+\sqrt{x+2+3\sqrt{2x-5}}=7\sqrt{2}$ $x=15$

88. $\sqrt{x+8+2\sqrt{x+7}}+\sqrt{x+1-\sqrt{x+7}}=4$ $x=2$

89. $\sqrt{2x-2\sqrt{2x-1}}-2\sqrt{2x+3-4\sqrt{2x-1}}+3\sqrt{2x+8-6\sqrt{2x-1}}=4$ $\left[1,\ \dfrac{5}{2}\right]\cup\{13\}$

90. $\dfrac{1}{4}x=\left(\sqrt{1+x}-1\right)\left(\sqrt{1-x}+1\right)$ $x=0$

91. $\sqrt{2x^2+7x+7}-\sqrt{2x^2-5x+7}=2x$

92. $\sqrt{x^2+5x+3}-\sqrt{x^2+3x+2}=2x+1$ $\left\{-\dfrac{1}{2},\ -\dfrac{2}{3}\right\}$

93. $\sqrt{x^2+3x-2}-\sqrt{x^2-x+1}=4x-3$ $\left\{\dfrac{7-\sqrt{13}}{6},\ \dfrac{3}{4}\right\}$

94. $7x-4=-\dfrac{7x^2}{\sqrt{x^2+1}+1}$ $x=\dfrac{36}{77}$

95. $2x-\sqrt{1+3x^2}=\sqrt{1+15x}$ $x=209$

96. $\sqrt{1+24x^2}=\sqrt{1+8x}-2x$ $\left\{0,\ \dfrac{3}{25}\right\}$

97. $\sqrt{1+48x^2}=\sqrt{1+8x}-4x$ $x=0$

98. $(3x+1)\sqrt{1-x^2}=\frac{x^2}{2}-3x-1$ $x=-\frac{12}{37}$

99. $(2x+3)\sqrt{x^2+1}=2x^2+3x-3$ $x=-\frac{15}{8}$

100. $(4x+1)\sqrt{x^2+1}=4x^2+x-1$ $x=-\frac{5}{12}$

101. $(x-5)\sqrt{x^2-14x+50}=x^2-12x+33$

102. $\left(10x^2+16x+3\right)\sqrt{x^2-1}=10x^3+16x^2-2x-8$ $\left\{-1,\ -\frac{73}{55}\right\}$

103. $\sqrt{\frac{1+2x\sqrt{1-x^2}}{2}}+2x^2=1$ $\left\{-\frac{1}{\sqrt{2}},\ \frac{-\sqrt{2}+\sqrt{6}}{4}\right\}$

104. $\sqrt{3x^2-7x+3}-\sqrt{x^2-2}=\sqrt{3x^2-5x-1}-\sqrt{x^2-3x+4}$ $x=2$

105. $\sqrt{(x+2)(2x-1)}-3\sqrt{x+6}=4-\sqrt{(x+6)(2x-1)}+3\sqrt{x+2}$ $x=7$

106. $(x+1)(5-x)\left(\sqrt{x-8}+2\right)=4$ $\varnothing$

107. $(x-2)(x-11)\left(\sqrt{-5-x}+8+\sqrt{x}\right)=1$ $\varnothing$

108. $\sqrt[3]{-x^2+2x-2}+\sqrt{-2x^2+4x+23}=4$ $x=1$