

Uprościć wyrażenia, rozwiązać równania

$$46. (a^2 - b^2 - c^2 + 2bc) : \frac{a+b-c}{a+b+c}$$

$$47. \frac{a^2-1}{n^2+an} \left(\frac{1}{1-\frac{1}{n}} - 1 \right) \frac{a-an^3-n^4+n}{1-a^2}$$

$$48. \frac{x}{ax-2a^2} - \frac{2}{x^2+x-2ax-2a} \left(1 + \frac{3x+x^2}{3+x} \right)$$

$$49. \frac{2a}{a^2-4x^2} + \frac{1}{2x^2+6x-ax-3a} \left(x + \frac{3x-6}{x-2} \right)$$

$$50. \left(\frac{2a+10}{3a-1} + \frac{130-a}{1-3a} + \frac{30}{a} - 3 \right) \frac{3a^3+8a^2-3a}{1-\frac{1}{4}a^2}$$

$$51. \frac{a^2-b^2}{a-b} - \frac{a^3-b^3}{a^2-b^2}$$

$$52. \frac{x}{x^2+y^2} - \frac{y(x-y)^2}{x^4-y^4}$$

$$53. \frac{2}{3} \left[\frac{1}{1+\left(\frac{2x+1}{\sqrt{3}}\right)^2} + \frac{1}{1+\left(\frac{2x-1}{\sqrt{3}}\right)^2} \right]$$

$$54. \left[\frac{a-1}{a^2-2a+1} + \frac{2(a-1)}{a^2-4} - \frac{4(a+1)}{a^2+a-2} + \frac{a}{a^2-3a+2} \right] \times \frac{36a^3-144a-36a^2+144}{a^3+27}$$

$$55. \left[\frac{3(x+2)}{2(x^3+x^2+x+1)} + \frac{2x^2-x-10}{2(x^3-x^2+x-1)} \right] : \left[\frac{5}{x^2+1} + \frac{3}{2(x+1)} - \frac{3}{2(x-1)} \right]$$

$$56. \left(\frac{x-y}{2y-x} - \frac{x^2+y^2+y-2}{x^2-xy-2y^2} \right) : \frac{4x^4+4x^2y+y^2-4}{x^2+y+xy+x}$$

$$57. \frac{a^2+a-2}{a^{n+1}-3a^n} \left[\frac{(a+2)^2-a^2}{4a^2-4} - \frac{3}{a^2-a} \right]$$

$$58. \frac{2a^2(b+c)^{2n}-\frac{1}{2}}{an^2-a^3-2a^2-a} : \frac{2a(b+c)^n-1}{a^2c-a(nc-c)}$$

$$59. \frac{1}{a(a-b)(a-c)} + \frac{1}{b(b-a)(b-c)} + \frac{1}{c(c-a)(c-b)}$$

$$60. \frac{1+(a+x)^{-1}}{1-(a+x)^{-1}} \left[1 - \frac{1-(a^2+x^2)}{2ax} \right]; x = \frac{1}{a-1}$$

$$61. \left[\frac{2+ba^{-1}}{a+2b} - 6b(4b^2-a^2)^{-1} \right] : \left(2a^n b + 3a^{n+1} - \frac{6a^{n+2}}{2a-b} \right)^{-1}$$

$$62. \frac{[1-(\frac{a}{b})^{-2}]a^2}{(\sqrt{a}-\sqrt{b})^2+2\sqrt{ab}}$$

$$63. \frac{b}{a-b} \sqrt[3]{(a^2-2ab+b^2)(a^2-b^2)(a+b)} \times \frac{a^3-b^3}{\sqrt[3]{(a+b)^2}}$$

$$64. \sqrt[6]{8x(7+4\sqrt{3})} \sqrt[3]{2\sqrt{6x}-4\sqrt{2x}}$$

$$65. \frac{a}{2} \sqrt[4]{(a+1)(a^2-1)(1+2a+a^2)} \times \left(\frac{a^2+3a+2}{\sqrt{a-1}} \right)^{-1}$$

$$66. \sqrt{\frac{(1+a)\sqrt[3]{1+a}}{3a}} \sqrt[3]{\frac{\sqrt{3}}{9+18a^{-1}+9a^{-2}}}$$

$$67. ab^{\frac{n}{2}} \sqrt{a^{1-n}b^{-n} - a^{-n}b^{1-n}} \sqrt{a-b}^{-1}$$

$$68. \left(\frac{15}{\sqrt{6+1}} + \frac{4}{\sqrt{6-2}} - \frac{12}{3-\sqrt{6}} \right) (\sqrt{6}+11)$$

$$69. \left(\frac{1}{\sqrt{a}-\sqrt{a-b}} + \frac{1}{\sqrt{a}+\sqrt{a+b}} \right) : \left(1 + \sqrt{\frac{a+b}{a-b}} \right)$$

$$70. \left(\frac{1}{b-\sqrt{a}} + \frac{1}{b+\sqrt{a}} \right) : \left(\frac{1}{9} \right)^{-\frac{1}{2}} a^{-2} b^{-1}$$

$$71. \frac{\sqrt{\frac{1+a}{1-a}} + \sqrt{\frac{1-a}{1+a}}}{\sqrt{\frac{1+a}{1-a}} - \sqrt{\frac{1-a}{1+a}}} - \frac{1}{a}$$

$$72. \frac{xy - \sqrt{x^2-1}\sqrt{y^2-1}}{xy + \sqrt{x^2-1}\sqrt{y^2-1}}; \\ x = \frac{1}{2} \left(a + \frac{1}{a} \right), y = \frac{1}{2} \left(b + \frac{1}{b} \right); \\ (a \geq 1, b \geq 1)$$

$$73. \frac{\sqrt{a+bx} + \sqrt{a-bx}}{\sqrt{a+bx} - \sqrt{a-bx}}; x = \frac{2am}{b(1+m^2)}; |m| < 1$$

$$74. \frac{(m+x)^{\frac{1}{2}} + (m-x)^{\frac{1}{2}}}{(m+x)^{\frac{1}{2}} - (m-x)^{\frac{1}{2}}} x = \frac{2mn}{n^2+1} \quad m > 0, 0 < n < 1$$

$$75. \left[\frac{(1-x^2)^{-\frac{1}{2}} + 1}{2} \right]^{-\frac{1}{2}} + \left[\frac{(1-x^2)^{-\frac{1}{2}} - 1}{2} \right]; \\ x = 2k^{\frac{1}{2}}(1+k)^{-1}, k > 1$$

$$76. \left(\frac{1}{2} - \frac{1}{4a^{-1}} - \frac{2^{-2}}{a} \right) \left[(a-1)\sqrt[3]{(a+1)^{-3}} - \frac{(a+1)^{\frac{3}{2}}}{\sqrt{(a^2-1)(a-1)}} \right]$$

$$77. \left(2\sqrt{x^4-a^2x^2} - \frac{2a^2}{\sqrt{1-a^2x^{-2}}} \right) \frac{(x^2a^{-2}-4+4a^2x^{-2})^{-\frac{1}{2}}}{2ax(x^2-a^2)^{-\frac{1}{2}}}$$

$$78. \frac{a \left(\frac{\sqrt{a}+\sqrt{b}}{2b\sqrt{a}} \right)^{-1} + b \left(\frac{\sqrt{b}+\sqrt{a}}{2a\sqrt{b}} \right)^{-1}}{\left(\frac{a+\sqrt{ab}}{2ab} \right)^{-1} + \left(\frac{b+\sqrt{ba}}{2ba} \right)^{-1}}$$

$$79. \left(\frac{\sqrt{a}+\sqrt{x}}{\sqrt{a+x}} - \frac{\sqrt{a+x}}{\sqrt{a}+\sqrt{x}} \right)^{-2} - \left(\frac{\sqrt{a}-\sqrt{x}}{\sqrt{a+x}} - \frac{\sqrt{a+x}}{\sqrt{a}-\sqrt{x}} \right)^{-2}$$

$$80. \frac{1}{2} \left(\sqrt{x^2+a} + \frac{x^2}{\sqrt{x^2+a}} \right) + \frac{a}{2} \frac{1+\frac{x}{\sqrt{x^2+a}}}{x+\sqrt{x^2+a}}$$

$$81. 2x + \sqrt{x^2-1} \left(1 + \frac{x^2}{x^2-1} \right) - \frac{1+\frac{x}{\sqrt{x^2-1}}}{x+\sqrt{x^2-1}}$$

$$82. \left[a^{-\frac{3}{2}} b (ab^{-2})^{-\frac{1}{2}} (a^{-1})^{-\frac{2}{3}} \right]^3 \\ a = \frac{\sqrt{2}}{2}, b = \frac{1}{\sqrt{2}}$$

$$83. (a+1)^{-1} + (b+1)^{-1} \\ a = (2+\sqrt{3})^{-1}, b = (2-\sqrt{3})^{-1}$$

$$84. \frac{x+\sqrt{x^2-4x}}{x-\sqrt{x^2-4x}} - \frac{x-\sqrt{x^2-4x}}{x+\sqrt{x^2-4x}}$$