

Радикальные преобразования. Квадратные уравнения

Задача 1. Упростить:

- $a + 2\sqrt{a} + 1$
- $\frac{x-1}{\sqrt{x}-1}$
- $\frac{(\sqrt{x} + \sqrt{2})^2 - \sqrt{2x}}{x^2 + x - \sqrt{2x} + 2}$
- $\frac{\sqrt{x} + 1}{x\sqrt{x} + x + \sqrt{x}} : \frac{1}{x^2 - \sqrt{x}}$
- $\left(\frac{\sqrt{x} + 1}{\sqrt{x} - 1} - \frac{\sqrt{x} - 1}{\sqrt{x} + 1} + 4\sqrt{x}\right) \cdot \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)$
- $\left(\frac{x}{2} - \frac{1}{2\sqrt{x}}\right) \cdot \left(\frac{x - \sqrt{x}}{\sqrt{x} + 1} - \frac{x + \sqrt{x}}{\sqrt{x} - 1}\right)$
- $\left(\frac{x\sqrt{x} - 1}{\sqrt{x} - 1} + \sqrt{x}\right) : \frac{x-1}{\sqrt{x}-1}$
- $\left(\frac{a^2\sqrt{a} + a\sqrt{a}}{1+a} + 1\right) : \frac{1-a^3}{1-a\sqrt{a}}$
- $\frac{\sqrt{\frac{m+2}{m-2}} + \sqrt{\frac{m-2}{m+2}}}{\sqrt{\frac{m+2}{m-2}} - \sqrt{\frac{m-2}{m+2}}}$
- $\frac{\sqrt{2b + 2\sqrt{b^2 - 4}}}{\sqrt{b^2 - 4} + b + 2}$
- $\frac{\sqrt{\sqrt{\frac{x-1}{x+1}} + \sqrt{\frac{x+1}{x-1}} - 2(2x + \sqrt{x^2 - 1})}}{\sqrt{(x+1)^3} - \sqrt{(x-1)^3}}$
- $\left(\frac{\sqrt{1+x}}{\sqrt{1+x} - \sqrt{1-x}} + \frac{1-x}{\sqrt{1-x^2} - 1+x}\right) \left(\sqrt{\frac{1}{x^2} - 1} - \frac{1}{x}\right), 0 < x < 1$

Задача 2. Вычислить (свести к более простому выражению):

- $\frac{\sqrt{21 + 8\sqrt{5}}}{4 + \sqrt{5}} \cdot \sqrt{9 - 4\sqrt{5}}$
- $\frac{-\frac{2}{\sqrt{3} - \sqrt{5}} + \frac{2}{\sqrt{3} + \sqrt{5}}}{\frac{\sqrt{3} - \sqrt{5}}{2} - \frac{\sqrt{3} + \sqrt{5}}{2}} \cdot \frac{2\sqrt{15}}{2}$
- $\left(\frac{2\sqrt{2} + 7\sqrt{7}}{\sqrt{2} + \sqrt{7}} - \sqrt{14}\right) \cdot \left(\frac{\sqrt{2} + \sqrt{7}}{5}\right)^2$
- $\frac{5}{17 + 2\sqrt{66}} : \frac{\frac{1}{\sqrt{11}} - \frac{1}{\sqrt{6}}}{\frac{1}{11} + \frac{1}{6}}$
- $\left(\frac{\sqrt{15}}{\sqrt{3} - \sqrt{5}} + \sqrt{3}\right) \cdot \left(\frac{\sqrt{15}}{\sqrt{3} + \sqrt{5}} - \sqrt{3}\right) : \frac{15}{2}$
- $\left(\frac{2}{7 - \sqrt{42}} + \frac{2}{7 + \sqrt{42}}\right) \cdot \left(6 + \frac{7\sqrt{7}}{\sqrt{6}}\right) : \left(\frac{\sqrt{6} - \sqrt{7}}{\sqrt{6}} + \frac{\sqrt{7}}{\sqrt{6} - \sqrt{7}}\right)$
- $\frac{2 + \sqrt{3}}{\sqrt{2} + \sqrt{2 + \sqrt{3}}} + \frac{2 - \sqrt{3}}{\sqrt{2} - \sqrt{2 - \sqrt{3}}}$
- $\frac{\sqrt{11 + \sqrt{3}}}{\sqrt{59}} \cdot \sqrt{4 + \sqrt{5 + \sqrt{3}}} \cdot \sqrt{3 + \sqrt{5 + \sqrt{5 + \sqrt{3}}}} \cdot \sqrt{3 - \sqrt{5 + \sqrt{5 + \sqrt{3}}}}$
- $\frac{\sqrt{5 - 2\sqrt{6}}(5 + 2\sqrt{6})(49 - 20\sqrt{6})}{\sqrt{27} - 3\sqrt{18} + 3\sqrt{12} - \sqrt{8}}$
- $\frac{1 + \frac{\sqrt{3}}{2}}{1 + \sqrt{1 + \frac{\sqrt{3}}{2}}} - \frac{1 - \frac{\sqrt{3}}{2}}{1 - \sqrt{1 - \frac{\sqrt{3}}{2}}}$
- $\left(\frac{(2\sqrt{2})^2 - (\sqrt{3} + \sqrt{10})^2}{7} - \frac{1}{(\sqrt{3} - \sqrt{10})(\sqrt{3} + \sqrt{10})}\right) : \frac{\sqrt{40}}{\sqrt{3} + \sqrt{10}}$

$$\bullet \frac{\sqrt{\left(4\frac{4}{5}\right)^2 - \frac{6}{5}} \cdot \sqrt{\frac{24}{5} - \sqrt{\frac{6}{5}}} \cdot \sqrt{\frac{24}{5} + \sqrt{\frac{6}{5}}}{\sqrt{\frac{\left(\frac{24}{5}\right)^3}{6} - 2\frac{24}{5} + \frac{6}{24}}}$$

Задача 3. Решить квадратное уравнение:

$$\bullet 2x^2 - 2x - 1 = 0$$

$$\bullet 16x^2 - 56x + 37 = 0$$

$$\bullet 9x^2 - 12x - 1 = 0$$

$$\bullet 4x^2 - 24x + 33 = 0$$

$$\bullet 49x^2 - 84x + 29 = 0$$

$$\bullet 2x^2 - 10x - 1 = 0$$

$$\bullet 25x^2 - 50x + 22 = 0$$

$$\bullet 18x^2 - 66x - 111 = 0$$

$$\bullet 9x^2 - 12x - 2 = 0$$

$$\bullet 9x^2 - 3x - 11 = 0$$

$$\bullet 16x^2 - 8x - 5 = 0$$

$$\bullet 25x^2 - 30x + 1 = 0$$

$$\bullet 4x^2 - 28x + 41 = 0$$

$$\bullet 100x^2 - 80x + 9 = 0$$