

$$\begin{aligned}
\text{e)} \quad & (3\sqrt{2} - \sqrt{27})(\sqrt{27} - \sqrt{2}) - \sqrt{54} = \\
& = 3\sqrt{2} \cdot \sqrt{27} - 3\sqrt{2} \cdot \sqrt{2} - \sqrt{27} \cdot \sqrt{27} + \sqrt{2} \cdot \sqrt{27} - \sqrt{54} = \\
& = 3 \cdot 3\sqrt{6} - 6 - 27 + \sqrt{2 \cdot 9 \cdot 3} - \sqrt{9 \cdot 3 \cdot 2} = \\
& = 9\sqrt{6} - 33 + 3\sqrt{6} - 3\sqrt{6} = 9\sqrt{6} - 33
\end{aligned}$$

№423

$$\begin{aligned}
\text{a)} \quad & (x + \sqrt{y})(x - \sqrt{y}) = x^2 - y; \\
\text{б)} \quad & (\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b}) = \sqrt{a} \cdot \sqrt{a} - \sqrt{b} \cdot \sqrt{b} = a - b; \\
\text{в)} \quad & (\sqrt{11} - 3)(\sqrt{11} + 3) = \sqrt{11} \cdot \sqrt{11} - 3 \cdot 3 = 2; \\
& (\sqrt{10} + \sqrt{7})(\sqrt{7} - \sqrt{10}) = \sqrt{7} \cdot \sqrt{7} - \sqrt{10} \cdot \sqrt{10} = 7 - 10 = -3; \\
\text{г)} \quad & (\sqrt{a} + \sqrt{b})^2 = (\sqrt{a})^2 + 2\sqrt{a} \cdot \sqrt{b} + (\sqrt{b})^2 = \\
& = a + 2\sqrt{a} \cdot \sqrt{b} + b; \\
\text{е)} \quad & (\sqrt{m} - \sqrt{n})^2 = (\sqrt{m})^2 - 2\sqrt{m} \cdot \sqrt{n} + (\sqrt{n})^2 = \\
& = m - 2\sqrt{m} \cdot \sqrt{n} + n; \\
\text{ж)} \quad & (\sqrt{2} + 3)^2 = (\sqrt{2})^2 + 2\sqrt{2} \cdot 3 + 3^2 = 11 + 6\sqrt{2}; \\
\text{з)} \quad & (\sqrt{5} - \sqrt{2})^2 = (\sqrt{5})^2 - 2\sqrt{5} \cdot \sqrt{2} + (\sqrt{2})^2 = \\
& = 7 - 2\sqrt{10}.
\end{aligned}$$

№424

$$\begin{aligned}
\text{a)} \quad & (2\sqrt{5} + 1)(2\sqrt{5} - 1) = 4\sqrt{5} \cdot \sqrt{5} - 1 = 4 \cdot 5 - 1 = 19; \\
\text{б)} \quad & (5\sqrt{7} - \sqrt{13})(\sqrt{13} + 5\sqrt{7}) = (5\sqrt{7})^2 - \sqrt{13} \cdot \sqrt{13} = \\
& = 25 \cdot 7 - 13 = 175 - 13 = 162; \\
\text{в)} \quad & (3\sqrt{2} - 2\sqrt{3})(2\sqrt{3} + 3\sqrt{2}) = (3\sqrt{2})^2 - (2\sqrt{3})^2 = 9 \cdot 2 - 4 \cdot 3 = 18 - 12 = 6; \\
\text{г)} \quad & (0,5\sqrt{14} + \sqrt{3})(\sqrt{3} - 0,5\sqrt{14}) = (\sqrt{3})^2 - (0,5\sqrt{14})^2 = \\
& = 3 - 0,25 \cdot 14 = 3 - 3,5 = -0,5; \\
\text{д)} \quad & (1 + 3\sqrt{5})^2 = 1 + 2 \cdot 1 \cdot 3\sqrt{5} + (3\sqrt{5})^2 = 1 + 6\sqrt{5} + 9 \cdot 5 = \\
& = 46 + 6\sqrt{5}; \\
\text{е)} \quad & (2\sqrt{3} - 7)^2 = (2\sqrt{3})^2 - 2 \cdot 7 \cdot 2\sqrt{3} + 7^2 = \\
& = 12 + 49 - 28\sqrt{3} = 61 - 28\sqrt{3};
\end{aligned}$$

$$\text{ж)} (2\sqrt{10} - 2)^2 = (2\sqrt{10})^2 - 2 \cdot 2\sqrt{10} \cdot \sqrt{2} + (\sqrt{2})^2 = \\ = 40 - 4 \cdot 2\sqrt{5} + 2 = 42 - 8\sqrt{5};$$

$$\text{з)} (3\sqrt{6} - 2\sqrt{3})^2 = (3\sqrt{6})^2 - 2 \cdot 3\sqrt{6} \cdot 2\sqrt{3} + (2\sqrt{3})^2 = \\ = 9 \cdot 6 - 12\sqrt{2 \cdot 3 \cdot 3} + 4 \cdot 3 = 66 - 36\sqrt{2}.$$

№425

$$\text{а)} (\sqrt{6} + \sqrt{5})^2 - \sqrt{120} = (\sqrt{6})^2 + 2\sqrt{6} \cdot \sqrt{5} + (\sqrt{5})^2 - \sqrt{12 \cdot 10} = \\ = 6 + 2\sqrt{30} + 5 - \sqrt{4 \cdot 3 \cdot 2 \cdot 5} = 11;$$

$$\text{б)} \sqrt{60} + (\sqrt{3} - \sqrt{5})^2 = \sqrt{15 \cdot 4} + (\sqrt{3})^2 - 2\sqrt{3} \cdot \sqrt{5} + (\sqrt{5})^2 = \\ = 2\sqrt{15} + 3 - 2\sqrt{15} + 5 = 8;$$

$$\text{в)} (\sqrt{14} - 3\sqrt{2})^2 + 6\sqrt{28} = \\ = (\sqrt{14})^2 - 2 \cdot \sqrt{14} \cdot 3\sqrt{2} + (3\sqrt{2})^2 + 6\sqrt{4 \cdot 7} = \\ = 14 - 3 \cdot 2\sqrt{4 \cdot 7} + 9 \cdot 2 + 6 \cdot 2\sqrt{7} = 14 + 18 = 32;$$

$$\text{г)} (3\sqrt{5} + \sqrt{15})^2 - 10\sqrt{27} = \\ = (3\sqrt{5})^2 + 2 \cdot 3\sqrt{5} \cdot \sqrt{15} + (\sqrt{15})^2 - 10\sqrt{9 \cdot 3} = \\ = 9 \cdot 5 + 6\sqrt{5 \cdot 3 \cdot 5} + 15 - 10 \cdot 3\sqrt{3} = 60 + 30\sqrt{3} - 30\sqrt{3} = 60;$$

$$\text{д)} \left(\sqrt{4 + \sqrt{7}} + \sqrt{4 - \sqrt{7}} \right)^2 = \\ = \left(\sqrt{4 + \sqrt{7}} \right)^2 + 2\sqrt{4 + \sqrt{7}} \cdot \sqrt{4 - \sqrt{7}} + \left(\sqrt{4 - \sqrt{7}} \right)^2 = \\ = 4 + \sqrt{7} + 2 \left(\sqrt{4 + \sqrt{7}} \right) \left(\sqrt{4 - \sqrt{7}} \right) + 4 - \sqrt{7} = \\ = 8 + 2 \left(\sqrt{4^2 - \sqrt{7}^2} \right) = 8 + 2(\sqrt{16 - 7}) = 8 + 2\sqrt{9} = \\ = 8 + 6 = 14;$$

$$\text{е)} \left(\sqrt{5 + 2\sqrt{6}} - \sqrt{5 - 2\sqrt{6}} \right)^2 = \\ = \left(\sqrt{5 + 2\sqrt{6}} \right)^2 - 2\sqrt{5 + 2\sqrt{6}} \cdot \sqrt{5 - 2\sqrt{6}} + \left(\sqrt{5 - 2\sqrt{6}} \right)^2 =$$

$$= 5 + 2\sqrt{6} - 2\left(\sqrt{5+2\sqrt{6}}\right) \cdot \left(\sqrt{5-2\sqrt{6}}\right) + 5 - 2\sqrt{6} =$$

$$= 10 - 2\left(\sqrt{25-4 \cdot 6}\right) = 10 - 2\sqrt{1} = 8.$$

№426

- а) $(\sqrt{x} + 1)(\sqrt{x} - 1) = (\sqrt{x})^2 - 1^2 = x - 1;$
- б) $(\sqrt{x} - \sqrt{a})(\sqrt{x} + \sqrt{a}) = (\sqrt{x})^2 - (\sqrt{a})^2 = x - a;$
- в) $(\sqrt{m} + \sqrt{2})^2 = (\sqrt{m})^2 + 2\sqrt{m} \cdot \sqrt{2} + (\sqrt{2})^2 = m + 2\sqrt{2m} + 2;$
- г) $(\sqrt{3} - \sqrt{x})^2 = (\sqrt{3})^2 - 2\sqrt{3} \cdot \sqrt{x} + (\sqrt{x})^2 = 3 - 2\sqrt{3x} + x;$
- д) $(5\sqrt{7} - 13)(5\sqrt{7} + 13) = (5\sqrt{7})^2 - 13^2 = 175 - 169 = 6;$
- е) $(2\sqrt{2} + 3\sqrt{3})(2\sqrt{2} - 3\sqrt{3}) = (2\sqrt{2})^2 - (3\sqrt{3})^2 = 4 \cdot 2 - 9 \cdot 3 = -19;$
- ж) $(6 - \sqrt{2})^2 + 3\sqrt{32} = 6^2 - 2 \cdot 6\sqrt{2} + (\sqrt{2})^2 + 3\sqrt{16 \cdot 2} =$
 $= 36 - 12\sqrt{2} + 2 + 3 \cdot 4\sqrt{2} = 38;$
- з) $(\sqrt{2} + \sqrt{18})^2 - 30 = (\sqrt{2})^2 + 2\sqrt{2} \cdot \sqrt{18} + (\sqrt{18})^2 - 30 =$
 $= 2 + 2\sqrt{2 \cdot 2 \cdot 9} + 18 - 30 = 20 + 12 - 30 = 2.$

№427

а) $x^2 - 7 = (x - \sqrt{7})(x + \sqrt{7});$

- б) $5 - c^2 = (\sqrt{5-c})(\sqrt{5+c});$
- в) $4a^2 - 3 = (2a - \sqrt{3})(2a + \sqrt{3});$
- г) $11 - 16b^2 = (\sqrt{11} - 4b)(\sqrt{11} + 4b);$
- д) $y - 3 = (\sqrt{y} - \sqrt{3})(\sqrt{y} + \sqrt{3});$
- е) $x - y = (\sqrt{x} - \sqrt{y})(\sqrt{x} + \sqrt{y}).$

№428

- а) $3 + \sqrt{3} = \sqrt{3} \cdot \sqrt{3} + \sqrt{3} = \sqrt{3}(\sqrt{3} + 1);$
- б) $10 - 2\sqrt{10} = \sqrt{10} \cdot \sqrt{10} - 2\sqrt{10} = \sqrt{10}(\sqrt{10} - 2);$
- в) $\sqrt{x} + x = \sqrt{x} + \sqrt{x} \cdot \sqrt{x} = \sqrt{x}(1 + \sqrt{x});$
- г) $a - 5\sqrt{a} = \sqrt{a} \cdot \sqrt{a} - 5\sqrt{a} = \sqrt{a}(\sqrt{a} - 5);$

- д) $\sqrt{a} - \sqrt{2a} = \sqrt{a} - \sqrt{2} \cdot \sqrt{a} = \sqrt{a}(1 - \sqrt{2})$;
 е) $\sqrt{3m} + \sqrt{5m} = \sqrt{3} \cdot \sqrt{m} + \sqrt{5} \cdot \sqrt{m} = \sqrt{m}(\sqrt{3} + \sqrt{5})$;
 ж) $\sqrt{14} - \sqrt{7} = \sqrt{7}(\sqrt{2} - 1)$;
 з) $\sqrt{33} + \sqrt{22} = \sqrt{3} \cdot \sqrt{11} + \sqrt{2} \cdot \sqrt{11} = \sqrt{11}(\sqrt{3} + \sqrt{2})$.

№429

- а) $\frac{b^2 - 5}{b - \sqrt{5}} = \frac{(b - \sqrt{5})(b + \sqrt{5})}{b - \sqrt{5}} = b + \sqrt{5}$;
 б) $\frac{m + \sqrt{6}}{6 - m^2} = \frac{m + \sqrt{6}}{(\sqrt{6} - m)(\sqrt{6} + m)} = \frac{1}{\sqrt{6} - m}$;
 в) $\frac{2 - \sqrt{x}}{x - 4} = \frac{2 - \sqrt{x}}{(\sqrt{x} - 2)(\sqrt{x} + 2)} = -\frac{1}{\sqrt{x} + 2}$;
 г) $\frac{b - 9}{\sqrt{b} + 3} = \frac{(\sqrt{b} - 3)(\sqrt{b} + 3)}{\sqrt{b} + 3} = \sqrt{b} - 3$;
 д) $\frac{a - b}{\sqrt{b} + \sqrt{a}} = \frac{(\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b})}{\sqrt{a} + \sqrt{b}} = \sqrt{a} - \sqrt{b}$;
 е) $\frac{2\sqrt{x} - 3\sqrt{y}}{4x - 9y} = \frac{2\sqrt{x} - 3\sqrt{y}}{(2\sqrt{x} - 3\sqrt{y})(2\sqrt{x} + 3\sqrt{y})} = \frac{1}{2\sqrt{x} + 3\sqrt{y}}$;
 ж) $\frac{\sqrt{7} - 7}{\sqrt{7} - 1} = \frac{\sqrt{7}(1 - \sqrt{7})}{\sqrt{7} - 1} = -\frac{\sqrt{7}(\sqrt{7} - 1)}{\sqrt{7} - 1} = -\sqrt{7}$;
 з) $\frac{a - \sqrt{a}}{\sqrt{a} - 1} = \frac{\sqrt{a}(\sqrt{a} - 1)}{\sqrt{a} - 1} = \sqrt{a}$;
 и) $\frac{3 + \sqrt{x}}{3\sqrt{x} + x} = \frac{3 + \sqrt{x}}{\sqrt{x}(3 + \sqrt{x})} = \frac{1}{\sqrt{x}}$.

№430

- а) $\frac{x^2 - 2}{x + \sqrt{2}} = \frac{(x - \sqrt{2})(x + \sqrt{2})}{x + \sqrt{2}} = x - \sqrt{2}$;
 б) $\frac{\sqrt{5} - a}{5 - a^2} = \frac{\sqrt{5} - a}{(\sqrt{5} - a)(\sqrt{5} + a)} = \frac{1}{\sqrt{5} + a}$;

$$\begin{aligned}
\text{в)} \quad \frac{\sqrt{x}-5}{25-x} &= \frac{\sqrt{x}-5}{(\sqrt{5}-\sqrt{x})(\sqrt{5}+\sqrt{x})} = -\frac{1}{5+\sqrt{x}}; \\
\text{г)} \quad \frac{\sqrt{2}+2}{\sqrt{2}} &= \frac{\sqrt{2}+\sqrt{2} \cdot \sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}(1+\sqrt{2})}{\sqrt{2}} = 1+\sqrt{2}; \\
\text{д)} \quad \frac{5+\sqrt{10}}{\sqrt{10}} &= \frac{\sqrt{5} \cdot \sqrt{5} + \sqrt{5} \cdot \sqrt{2}}{\sqrt{5} \cdot \sqrt{2}} = \frac{\sqrt{5}+\sqrt{2}}{\sqrt{2}}; \\
\text{е)} \quad \frac{2\sqrt{3}-3}{5\sqrt{3}} &= \frac{2\sqrt{3}-\sqrt{3} \cdot \sqrt{3}}{5\sqrt{3}} = \frac{\sqrt{3}(2-\sqrt{3})}{5\sqrt{3}} = \frac{2-\sqrt{3}}{5}; \\
\text{ж)} \quad \frac{\sqrt{2a}-\sqrt{2b}}{3\sqrt{a}-3\sqrt{b}} &= \frac{\sqrt{2}(\sqrt{a}-\sqrt{b})}{3(\sqrt{a}-\sqrt{b})} = \frac{\sqrt{2}}{3}; \\
\text{з)} \quad \frac{\sqrt{x}+1}{x+\sqrt{x}} &= \frac{\sqrt{x}+1}{\sqrt{x}(\sqrt{x}+1)} = \frac{1}{\sqrt{x}}; \\
\text{и)} \quad \frac{a+\sqrt{a}}{a\sqrt{a}+a} &= \frac{\sqrt{a} \cdot \sqrt{a} + \sqrt{a}}{a(\sqrt{a}+1)} = \frac{\sqrt{a}(\sqrt{a}+1)}{a(\sqrt{a}+1)} = \frac{\sqrt{a}}{a}.
\end{aligned}$$

№431

$$\begin{aligned}
\text{а)} \quad \frac{x}{\sqrt{5}} &= \frac{x\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{x\sqrt{5}}{5}; \\
\text{б)} \quad \frac{3}{\sqrt{b}} &= \frac{3\sqrt{b}}{\sqrt{b} \cdot \sqrt{b}} = \frac{3\sqrt{b}}{b};
\end{aligned}$$

$$\begin{aligned}
\text{в)} \quad \frac{2}{7\sqrt{y}} &= \frac{2\sqrt{y}}{7\sqrt{y} \cdot \sqrt{y}} = \frac{2\sqrt{y}}{7y}; \\
\text{г)} \quad \frac{a}{b\sqrt{b}} &= \frac{a\sqrt{b}}{b\sqrt{b} \cdot \sqrt{b}} = \frac{a\sqrt{b}}{b \cdot b} = \frac{a\sqrt{b}}{b^2}; \\
\text{д)} \quad \frac{4}{\sqrt{a+b}} &= \frac{4(\sqrt{a+b})}{(\sqrt{a+b})(\sqrt{a+b})} = \frac{4(\sqrt{a+b})}{a+b}; \\
\text{е)} \quad \frac{1}{\sqrt{a-b}} &= \frac{1 \cdot \sqrt{a-b}}{(\sqrt{a-b})(\sqrt{a-b})} = \frac{\sqrt{a-b}}{a-b};
\end{aligned}$$

$$\text{ж)} \frac{5}{2\sqrt{3}} = \frac{5\sqrt{3}}{2\sqrt{3} \cdot \sqrt{3}} = \frac{5\sqrt{3}}{2 \cdot 3} = \frac{5\sqrt{3}}{6};$$

$$\text{з)} \frac{8}{3\sqrt{2}} = \frac{8\sqrt{2}}{3\sqrt{2} \cdot \sqrt{2}} = \frac{8\sqrt{2}}{3 \cdot 2} = \frac{4\sqrt{2}}{3};$$

$$\text{и)} \frac{3\sqrt{5}}{5\sqrt{2}} = \frac{3\sqrt{5} \cdot \sqrt{2}}{5\sqrt{2} \cdot \sqrt{2}} = \frac{3\sqrt{10}}{5 \cdot 2} = \frac{3\sqrt{10}}{10} = 0,3\sqrt{10}.$$

№432

$$\text{а)} \frac{m}{\sqrt{x}} = \frac{m\sqrt{x}}{\sqrt{x} \cdot \sqrt{x}} = \frac{m\sqrt{x}}{x};$$

$$\text{б)} \frac{1}{\sqrt{2}} = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{2}}{2};$$

$$\text{в)} \frac{3}{5\sqrt{c}} = \frac{3 \cdot \sqrt{c}}{5\sqrt{c} \cdot \sqrt{c}} = \frac{3\sqrt{c}}{5c};$$

$$\text{г)} \frac{a}{2\sqrt{3}} = \frac{a\sqrt{3}}{2\sqrt{3} \cdot \sqrt{3}} = \frac{a\sqrt{3}}{6};$$

$$\text{д)} \frac{3}{2\sqrt{3}} = \frac{3\sqrt{3}}{2\sqrt{3} \cdot \sqrt{3}} = \frac{3\sqrt{3}}{2 \cdot 3} = \frac{\sqrt{3}}{2};$$

$$\text{е)} \frac{5}{4\sqrt{15}} = \frac{5\sqrt{15}}{4\sqrt{15} \cdot \sqrt{15}} = \frac{5\sqrt{15}}{4 \cdot 15} = \frac{\sqrt{15}}{12}.$$

433.

$$\text{а)} \frac{4}{\sqrt{3}+1} = \frac{4(\sqrt{3}-1)}{(\sqrt{3}+1)(\sqrt{3}-1)} = \frac{4(\sqrt{3}-1)}{(\sqrt{3})^2-1^2} = \frac{4(\sqrt{3}-1)}{3-1} = 2(\sqrt{3}-1);$$

$$\text{б)} \frac{1}{1-\sqrt{2}} = \frac{1 \cdot (1+\sqrt{2})}{(1-\sqrt{2})(1+\sqrt{2})} = \frac{1+\sqrt{2}}{1-(\sqrt{2})^2} = \frac{1+\sqrt{2}}{1-2} = -\frac{1+\sqrt{2}}{1} = -(1+\sqrt{2});$$

$$\text{в)} \frac{1}{\sqrt{x}-\sqrt{y}} = \frac{1 \cdot (\sqrt{x}+\sqrt{y})}{(\sqrt{x}-\sqrt{y})(\sqrt{x}+\sqrt{y})} = \frac{\sqrt{x}+\sqrt{y}}{(\sqrt{x})^2-(\sqrt{y})^2} = \frac{\sqrt{x}+\sqrt{y}}{x-y};$$

$$\text{г)} \frac{a}{\sqrt{a}+\sqrt{b}} = \frac{a(\sqrt{a}-\sqrt{b})}{(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b})} = \frac{a(\sqrt{a}-\sqrt{b})}{(\sqrt{a})^2-(\sqrt{b})^2} = \frac{a(\sqrt{a}-\sqrt{b})}{a-b};$$

$$\text{д)} \frac{33}{7-3\sqrt{3}} = \frac{33(7+3\sqrt{3})}{(7-3\sqrt{3})(7+3\sqrt{3})} = \frac{33(7+3\sqrt{3})}{7^2-3^2 \cdot (\sqrt{3})^2} = \frac{33(7+3\sqrt{3})}{22} =$$

$$= \frac{3(7+3\sqrt{3})}{2};$$

$$\text{e) } \frac{15}{2\sqrt{5}+5} = \frac{15(2\sqrt{5}-5)}{(2\sqrt{5}+5)(2\sqrt{5}-5)} = \frac{15(2\sqrt{5}-5)}{(2\sqrt{5})^2-5^2} = \frac{15(2\sqrt{5}-5)}{4 \cdot 5 - 25} =$$

$$= -\frac{15(2\sqrt{5}-5)}{5} = -3(2\sqrt{5}-5) = 15 - 6\sqrt{5}.$$

435.

$$\text{a) } \frac{x}{x+\sqrt{y}} = \frac{x(x-\sqrt{y})}{(x+\sqrt{y})(x-\sqrt{y})} = \frac{x(x-\sqrt{y})}{x^2-(\sqrt{y})^2} = \frac{x(x-\sqrt{y})}{x^2-y};$$

$$\text{б) } \frac{b}{a-\sqrt{b}} = \frac{b(a+\sqrt{b})}{(a-\sqrt{b})(a+\sqrt{b})} = \frac{ab+b\sqrt{b}}{a^2-(\sqrt{b})^2} = \frac{ab+b\sqrt{b}}{a^2-b};$$

$$\text{в) } \frac{4}{\sqrt{10}-\sqrt{2}} = \frac{4(\sqrt{10}+\sqrt{2})}{(\sqrt{10}-\sqrt{2})(\sqrt{10}+\sqrt{2})} = \frac{4(\sqrt{10}+\sqrt{2})}{(\sqrt{10})^2-(\sqrt{2})^2} = \frac{4(\sqrt{10}+\sqrt{2})}{8} =$$

$$= \frac{(\sqrt{10}+\sqrt{2})}{2};$$

$$\text{г) } \frac{12}{\sqrt{3}+\sqrt{6}} = \frac{12(\sqrt{3}-\sqrt{6})}{(\sqrt{3}+\sqrt{6})(\sqrt{3}-\sqrt{6})} = \frac{12(\sqrt{3}-\sqrt{6})}{(\sqrt{3})^2-(\sqrt{6})^2} = -\frac{12(\sqrt{3}-\sqrt{6})}{3} =$$

$$= 4(\sqrt{6}-\sqrt{3});$$

$$\text{д) } \frac{9}{3-2\sqrt{2}} = \frac{9(3+2\sqrt{2})}{(3-2\sqrt{2})(3+2\sqrt{2})} = \frac{9(3+2\sqrt{2})}{3^2-(2\sqrt{2})^2} = \frac{9(3+2\sqrt{2})}{9-4 \cdot 2} =$$

$$= 9(3+2\sqrt{2});$$

$$\text{e) } \frac{14}{1+5\sqrt{2}} = \frac{14(1-5\sqrt{2})}{(1+5\sqrt{2})(1-5\sqrt{2})} = \frac{14(1-5\sqrt{2})}{1^2-(5\sqrt{2})^2} =$$

$$= \frac{14(1-5\sqrt{2})}{1-50} = -\frac{2 \cdot 7(1-5\sqrt{2})}{7 \cdot 7} = \frac{2(5\sqrt{2}-1)}{7}.$$

436.

$$\text{a) } \sqrt{\frac{3}{5}} = \frac{\sqrt{3}}{\sqrt{5}} = \frac{\sqrt{3} \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{\sqrt{15}}{5} = 0,2\sqrt{15}, \text{ что и требовалось доказать};$$

$$\text{б) } \sqrt{\frac{2}{a}} = \frac{\sqrt{2}}{\sqrt{a}} = \frac{\sqrt{2} \cdot \sqrt{a}}{\sqrt{a} \cdot \sqrt{a}} = \frac{\sqrt{2a}}{a} = \frac{1}{a}\sqrt{2a}, \text{ что и требовалось доказать}.$$

437.

$$\text{a) } \sqrt{\frac{x}{3}} = \frac{\sqrt{x} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{3x}}{3};$$

$$\text{б) } \sqrt{\frac{5}{a}} = \frac{\sqrt{5} \cdot \sqrt{a}}{\sqrt{a} \cdot \sqrt{a}} = \frac{\sqrt{5a}}{a};$$

$$\text{в) } \sqrt{\frac{2}{3}} = \frac{\sqrt{2} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{6}}{3};$$

$$\text{г) } \sqrt{\frac{1}{2}} = \frac{\sqrt{1} \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{2}}{2};$$

$$\text{д) } \sqrt{\frac{a^2}{2}} = \frac{\sqrt{a^2} \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{a\sqrt{2}}{4}; \quad a \geq 0$$

$$\text{е) } \sqrt{x^2 - \frac{x^2}{4}} = \sqrt{\frac{4x^2 - x^2}{4}} = \frac{\sqrt{3x^2}}{\sqrt{4}} = \frac{x\sqrt{3}}{2}; \quad x \geq 0$$

438.

$$\text{a) } \sqrt{\frac{m}{9}} = \frac{\sqrt{m}}{\sqrt{9}} = \frac{\sqrt{m}}{3};$$

$$\text{б) } \sqrt{\frac{a}{7}} = \frac{\sqrt{a} \cdot \sqrt{7}}{\sqrt{7} \cdot \sqrt{7}} = \frac{\sqrt{7a}}{7};$$

$$\text{в) } \sqrt{\frac{c}{12}} = \frac{\sqrt{c}}{\sqrt{12}} = \frac{\sqrt{c}}{\sqrt{3} \cdot \sqrt{4}} = \frac{\sqrt{c} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{4} \cdot \sqrt{3}} = \frac{\sqrt{3c}}{6};$$

$$\text{г) } \sqrt{\frac{8}{a}} = \frac{\sqrt{4} \cdot \sqrt{2}}{\sqrt{a}} = \frac{\sqrt{4} \cdot \sqrt{2} \cdot \sqrt{a}}{\sqrt{a} \cdot \sqrt{a}} = \frac{2\sqrt{2a}}{a}.$$

УПРАЖНЕНИЯ ДЛЯ ПОВТОРЕНИЯ

439.

$$\begin{aligned} \frac{9-x^2}{4x} \cdot \frac{8x}{x^2+6x+9} - 2 &= \frac{(3-x)(3+x) \cdot 8x}{4x(x+3)^2} - 2 = \frac{(3-x)(x+3) \cdot 8x}{4x(x+3)^2} - 2 = \\ &= \frac{2(3-x)}{x+3} - 2 = \frac{2(3-x) - 2(x+3)}{x+3} = \frac{6-2x-2x-6}{x+3} = -\frac{4x}{x+3}; \end{aligned}$$

подставляем $x=-2,5$ и находим:

$$-\frac{4x}{x+3} = \frac{-4 \cdot (-2,5)}{-2,5+3} = \frac{10}{0,5} = 20.$$

440.

Обозначим за S км – расстояние от А до В, тогда время велосипедиста в пути равно $\frac{S}{12}$ ч; $\frac{S}{48}$ ч – время мотоциклиста в пути. По условию задачи мотоциклист отправился в путь на 0,5 ч позже и прибыл на 1 ч 15 мин = 1,25 ч раньше, чем велосипедист.

Запишем уравнение: $\frac{S}{12} = 0,5 + \frac{S}{48} + 1,25$;

$$\frac{S}{12} = \frac{S}{48} + 1,75; \quad 4S = S + 84; \quad 3S = 84; \quad S = 28.$$

Ответ: АВ=28 км.

441.

$$a) \frac{3x-1}{2} + \frac{2-x}{3} + 1 = 0; \quad 6\left(\frac{3x-1}{2} + \frac{2-x}{3} + 1\right) = 0;$$

$$3(3x-1) + 2(2-x) + 6 = 0; \quad 9x-3+4-2x+6=0; \quad 7x=-7; \quad x=-1;$$

$$б) \frac{y-10}{6} - \frac{5-2y}{4} = 2,5; \quad 2(y-10) - 3(5-2y) = 2,5 \cdot 12;$$

$$2y-20-15+6y=30; \quad 8y=65; \quad y=8\frac{1}{8}; \quad y=8,125.$$

442.

Условие задачи, $S = \pi(R^2 - r^2)$; $S = \pi R^2 - \pi r^2$; $S + \pi r^2 = \pi R^2$, откуда

$$R^2 = \frac{S + \pi r^2}{\pi}; \quad R = \sqrt{\frac{S + \pi r^2}{\pi}}.$$

$$\text{Ответ: } R = \sqrt{\frac{S + \pi r^2}{\pi}}.$$

443.

1) Для прямой b уравнение: $y = -2x + 1$;

2) Для прямой a уравнение: $y = \frac{1}{5}x - 2$.

444.

- а) $x^2 - 7 = 0$; $x^2 = 7$; $x_{1,2} = \pm\sqrt{7}$;
 б) $x^2 + 49 = 0$; $x^2 = -49$; уравнение не имеет корней;
 в) $(x+1)^2 = 1$; $x+1 = \pm\sqrt{1}$; $x+1 = \pm 1$;
 1) $x+1 = 1$; $x_1 = 0$; 2) $x+1 = -1$; $x_2 = -2$;
 г) $(x-5)^2 = 2$; $x-5 = \pm\sqrt{2}$; 1) $x-5 = \sqrt{2}$; $x_1 = 5 + \sqrt{2}$;
 2) $x-5 = -\sqrt{2}$; $x_2 = 5 - \sqrt{2}$.

Дополнительные упражнения к главе II

К ПАРАГРАФУ 4

445.

- а) Да;
 б) не всегда;
 в) да;
 г) не всегда.

446.

- а) Да;
 б) да;
 в) да;
 г) не всегда.

447.

- а) Да;
 б) да;
 в) да;
 г) да.

448.

Считаем, что $x = 2n$, $y = 2k$, где n и k – натуральные числа. Тогда:

- а) $x - y = 2n - 2k = 2(n - k) = 2m$ - четное число;
 б) $xy = 2n \cdot 2k = 2(2nk) = 2m$ - четное число;
 в) $3x + y = 6n + 2k = 2(3n + k) = 2m$ - четное число.

449.

Считаем, что $x = 2n + 1$, $y = 2k + 1$. Тогда:

- а) $x + y = 2n + 1 + 2k + 1 = 2(n + k + 1) = 2m$ - четное число;

б) $x - y = 2n + 1 - 2k - 1 = 2n - 2k = 2(n - k)$ - четное число;

в) $xy = (2n + 1)(2k + 1) = 4nk + 2n + 2k + 1 = 2(2nk + n + k) + 1$ - нечетное число.

451.

а) $\frac{23}{64} = 0,359375(0);$

б) $-\frac{7}{25} = -0,28(0);$

в) $\frac{11}{13} = 0,(846153);$

г) $\frac{1}{27} = 0,(037);$

д) $\frac{2}{35} = 0,0(571428);$

е) $-\frac{7}{22} = -0,3(18);$

ж) $\frac{23}{30} = 0,7(6);$

з) $\frac{12}{55} = 0,2(18).$

452*.

Пусть $\frac{a}{b}$ - рациональное число; предположим, что $(\frac{a}{b})^2 = 3$, т.е.

$a^2 = 3b^2$. Пусть a содержит в своем разложении n простых множителей равных 3, где n - число натуральное или нуль. Тогда, число a^2 содержит в разложении $2n$ простых множителей, равных 3. Поскольку $a^2 = 3b^2$, то b^2 содержит в разложении $2n - 1$ простых множителей, но квадрат натурального числа должен быть четным, и мы приходим к противоречию. Итак, не существует рационального числа, квадрат которого равен 3.

454*.

а) Иррациональное число;

б) иррациональное число.

К ПАРАГРАФУ 5

455.

а) $0,3\sqrt{289} = 0,3 \cdot 17 = 5,1;$

б) $-4\sqrt{0,81} = -4 \cdot 0,9 = -3,6;$

в) $\sqrt{\frac{9}{49}} - 1 = \frac{3}{7} - 1 = \frac{3-7}{7} = -\frac{4}{7};$

г) $\frac{4}{\sqrt{256}} - \frac{1}{\sqrt{64}} = \frac{4}{16} - \frac{1}{8} = \frac{2-1}{8} = \frac{1}{8};$

д) $2\sqrt{0,0121} + \sqrt{100} = 2 \cdot 0,11 + 10 = 10,22;$

е) $\frac{\sqrt{0,16}}{2\sqrt{0,04}} = \frac{0,4}{2 \cdot 0,2} = \frac{0,4}{0,4} = 1;$

ж) $\sqrt{2500} - \sqrt{625} = 50 - 25 = 25;$

з) $\sqrt{\frac{64}{81}} - \sqrt{\frac{1}{9}} = \frac{8}{9} - \frac{1}{3} = \frac{8-3}{9} = \frac{5}{9};$

и) $-0,03\sqrt{10000} + \sqrt{16} = -0,03 \cdot 100 + 4 = -3 + 4 = 1;$

к) $\frac{1}{\sqrt{361}} + \sqrt{\frac{1}{4}} = \frac{1}{19} + \frac{1}{2} = \frac{21}{38}.$

456.

а) $5 - (3\sqrt{\frac{4}{9}} + \sqrt{0,25}) = 5 - (3 \cdot \frac{2}{3} + 0,5) = 5 - (2 + 0,5) = 5 - 2 - 0,5 =$
 $= 5 - 2,5 = 2,5;$

б) $11 : (0,15\sqrt{1600} - 0,29\sqrt{400}) = 11 : (0,15 \cdot 40 - 0,29 \cdot 20) = 11 : 0,2 =$
 $= 110 : 2 = 55;$

в) $(\sqrt{225} + 3\sqrt{121}) : (\frac{2}{3}\sqrt{0,09} + 0,78\sqrt{100}) =$
 $= (15 + 3 \cdot 11) : (\frac{2}{3} \cdot 0,3 + 0,78 \cdot 10) = 48 : (\frac{1}{5} + 7,8) = 48 : (0,2 + 7,8) = 48 : 8 = 6;$

г) $(-6\sqrt{\frac{1}{4}} + \frac{\sqrt{342}}{2} \cdot \frac{\sqrt{0,16}}{0,2}) : \sqrt{25} = ((-6) \cdot \frac{1}{2} + \frac{18 + 0,4}{2 \cdot 0,2}) : 5 = (-3 + 18) : 5 =$
 $= 15 : 5 = 3.$

457.

а) Подставим $x = 2$: $\sqrt{5x-10} = \sqrt{5 \cdot 2 - 10} = \sqrt{0} = 0$;

Подставим $x = 2,2$: $\sqrt{5x-10} = \sqrt{5 \cdot 2,2 - 10} = \sqrt{11-10} = 1$;

Подставим $x = 5,2$: $\sqrt{5x-10} = \sqrt{5 \cdot 5,2 - 10} = \sqrt{26-10} = \sqrt{16} = 4$;

Подставим $x = 22$: $\sqrt{5x-10} = \sqrt{5 \cdot 22 - 10} = \sqrt{110-10} = \sqrt{100} = 10$;

б) Подставим $y = 1$: $\sqrt{6-2y} = \sqrt{6-2 \cdot 1} = 2$;

Подставим $y = -1,5$: $\sqrt{6-2y} = \sqrt{6-2(-1,5)} = \sqrt{6+3} = \sqrt{9} = 3$;

Подставим $y = -15$: $\sqrt{6-2y} = \sqrt{6-2(-15)} = \sqrt{36} = 6$;

Подставим $y = -37,5$: $\sqrt{6-2y} = \sqrt{6-2(-37,5)} = \sqrt{81} = 9$;

в) Подставим $x = 0$: $\frac{3+\sqrt{x}}{3-\sqrt{x}} = \frac{3+\sqrt{0}}{3-\sqrt{0}} = 1$;

Подставим $x = 1$: $\frac{3+\sqrt{x}}{3-\sqrt{x}} = \frac{3+\sqrt{1}}{3-\sqrt{1}} = \frac{4}{2} = 1$;

Подставим $x = 16$: $\frac{3+\sqrt{x}}{3-\sqrt{x}} = \frac{3+\sqrt{16}}{3-\sqrt{16}} = \frac{3+4}{3-4} = -7$;

Подставим $x = 0,25$: $\frac{3+\sqrt{x}}{3-\sqrt{x}} = \frac{3+\sqrt{0,25}}{3-\sqrt{0,25}} = \frac{3+0,5}{3-0,5} = \frac{3,5}{2,5} = \frac{35}{25} = 1\frac{2}{5}$;

г) Подставим $a = 0$, $b = 0$: $\sqrt{2a-b} = \sqrt{2 \cdot 0 - 0} = 0$;

Подставим $a = 4$, $b = 7$: $\sqrt{2a-b} = \sqrt{2 \cdot 4 - 7} = \sqrt{8-7} = 1$;

д) Подставим $m = 0$, $n = -1$: $\sqrt{m-4n} = \sqrt{0-4 \cdot (-1)} = \sqrt{4} = 2$;

Подставим $m = 33$, $n = 1$: $\sqrt{m-4n} = \sqrt{33-4 \cdot 2} = \sqrt{25} = 5$.

458.

а) $5\sqrt{x} = 3$; $(5\sqrt{x})^2 = 3^2$; $25x = 9$; $x = \frac{9}{25}$;

б) $\frac{1}{\sqrt{3x}} = 1$; $1 = \sqrt{3x}$; $1^2 = (\sqrt{3x})^2$; $1 = 3x$; $x = \frac{1}{3}$;

в) $\frac{1}{4\sqrt{x}} = 2$; $1 = 8\sqrt{x}$; $1^2 = (8\sqrt{x})^2$; $1 = 64x$; $x = \frac{1}{64}$;

г) $\sqrt{x-5} = 4$; $(\sqrt{x-5})^2 = 4^2$; $x-5 = 16$; $x = 21$;

д) $1 + \sqrt{2x} = 10$; $\sqrt{2x} = 9$; $(\sqrt{2x})^2 = 9^2$; $2x = 81$; $x = 40,5$.

459*.

$$\sqrt{1+\sqrt{2+\sqrt{x}}} = 2; \quad (\sqrt{1+\sqrt{2+\sqrt{x}}})^2 = 2^2; \quad 1+\sqrt{2+\sqrt{x}} = 4; \quad \sqrt{2+\sqrt{x}} = 3;$$
$$(\sqrt{2+\sqrt{x}})^2 = 3^2; \quad 2+\sqrt{x} = 9; \quad \sqrt{x} = 7; \quad x = 49.$$

460.

а) Да; $\sqrt{3} + (-\sqrt{3}) = 0 \in Q$

б) нет.

462*.

а) $x \geq 0$;

б) x – любое действительное число;

в) x – любое действительное число;

г) x – любое действительное число;

д) $x = 0$;

е) $x \leq 0$.

463*.

а) \sqrt{ab} ; $ab \geq 0$;

1) $a \geq 0$, $b \geq 0$;

2) $a \leq 0$, $b \leq 0$;

б) $\sqrt{-ab}$; $ab \leq 0$;

1) $a \leq 0$, $b \geq 0$;

2) $a \geq 0$, $b \leq 0$;

в) $\sqrt{a^2b}$; $b \geq 0$; a – любое действительное число;

г) $\sqrt{a^2b^2}$; a, b – любые действительные числа;

д) $\sqrt{-ab^2}$; $a \leq 0$, b – любое действительное число.

464*.

а) При $x > 0$;

б) при $x \geq 0$;

в) при $x \geq 0$, $x \neq 1$.

465.

$$\text{а) } \sqrt{0,16} + (2\sqrt{0,1})^2 = 0,4 + 4 \cdot 0,1 = 0,8;$$

$$\text{б)} (0,2\sqrt{10})^2 + 0,5\sqrt{16} = 0,04 \cdot 10 + 0,5 \cdot 4 = 0,4 + 2 = 2,4;$$

$$\text{в)} \sqrt{144} - 0,5(\sqrt{12})^2 = 12 - 0,5 \cdot 12 = 6;$$

$$\text{г)} (3\sqrt{3})^2 + (-3\sqrt{3})^2 = 9 \cdot 3 + 9 \cdot 3 = 54;$$

$$\text{д)} (5\sqrt{2})^2 - (2\sqrt{5})^2 = 25 \cdot 2 - 4 \cdot 5 = 30;$$

$$\text{е)} (-3\sqrt{6})^2 - 3(\sqrt{6})^2 = 9 \cdot 6 - 3 \cdot 6 = 36.$$

К ПАРАГРАФУ 6

468.

$$\text{а)} \sqrt{196 \cdot 0,81 \cdot 0,36} = 14 \cdot 0,9 \cdot 0,6 = 14 \cdot 0,54 = 14 \cdot \frac{54}{100} = 7,56;$$

$$\text{б)} \sqrt{1\frac{9}{16} \cdot 5\frac{4}{9} \cdot 0,01} = \sqrt{\frac{25}{16} \cdot \frac{49}{9} \cdot 0,01} = \frac{5}{4} \cdot \frac{7}{3} \cdot 0,1 = \frac{5 \cdot 7 \cdot 1}{4 \cdot 3 \cdot 10} = \frac{7}{24};$$

$$\text{в)} \sqrt{0,87 \cdot 49 + 0,82 \cdot 49} = \sqrt{49(0,87 + 0,82)} = \sqrt{49 \cdot 1,69} = 7 \cdot 1,3 = 9,1;$$

$$\text{г)} \sqrt{1,44 \cdot 1,21 - 1,44 \cdot 0,4} = \sqrt{1,44 \cdot 0,81} = 1,2 \cdot 0,9 = \frac{12}{10} \cdot \frac{9}{10} = \frac{108}{100} = 1,08.$$

469.

$$\begin{aligned} \text{а)} \sqrt{\frac{165^2 - 124^2}{164}} &= \sqrt{\frac{(165 - 124)(165 + 124)}{164}} = \sqrt{\frac{41 \cdot 289}{164}} = \sqrt{\frac{289}{4}} = \\ &= \frac{17}{2} = 8,5; \end{aligned}$$

$$\begin{aligned} \text{б)} \sqrt{\frac{98}{176^2 - 112^2}} &= \sqrt{\frac{98}{(176 - 112)(176 + 112)}} = \sqrt{\frac{98}{64 \cdot 288}} = \sqrt{\frac{49}{64 \cdot 144}} = \\ &= \frac{7}{8 \cdot 12} = \frac{7}{96}; \end{aligned}$$

$$\text{в)} \sqrt{\frac{149^2 - 76^2}{457^2 - 384^2}} = \sqrt{\frac{(149 - 76)(149 + 76)}{(457 - 384)(457 + 384)}} = \sqrt{\frac{73 \cdot 225}{73 \cdot 841}} = \frac{15}{29};$$

$$\begin{aligned} \text{г)} \sqrt{\frac{145,5^2 - 96,5^2}{193,5^2 - 31,5^2}} &= \sqrt{\frac{(145,5 - 96,5)(145,5 + 96,5)}{(193,5 - 31,5)(193,5 + 31,5)}} = \\ &= \sqrt{\frac{49 \cdot 242}{(193,5 - 31,5)(193,5 + 31,5)}} = \sqrt{\frac{49 \cdot 121}{81 \cdot 225}} = \frac{7 \cdot 11}{9 \cdot 15} = \frac{77}{135}. \end{aligned}$$

470.

а) $15\sqrt{20} \cdot 0,1\sqrt{45} = 1,5\sqrt{20 \cdot 45} = 1,5\sqrt{900} = 1,5 \cdot 30 = 45;$

б) $0,3\sqrt{10} \cdot 0,2\sqrt{15} \cdot 0,5\sqrt{6} = 0,3 \cdot 0,2 \cdot 0,5\sqrt{10 \cdot 15 \cdot 6} = 0,03\sqrt{900} = 0,3 \cdot \sqrt{9} = 0,9;$

в) $\frac{8\sqrt{5}}{0,4\sqrt{0,2}} = \frac{8}{0,4} \sqrt{\frac{5}{0,2}} = 20\sqrt{25} = 100;$

г) $\frac{\sqrt{0,48}}{5\sqrt{12}} = \frac{1}{5} \sqrt{\frac{0,48}{12}} = \frac{1}{5} \sqrt{0,04} = \frac{1}{5} \cdot 0,2 = \frac{1}{25}.$

471*.

а) $\sqrt{ab} = \sqrt{-a} \cdot \sqrt{-b};$

б) $\sqrt{\frac{a}{b}} = \frac{\sqrt{-a}}{\sqrt{-b}}.$

472.

а) $\sqrt{(-12)^2} = |12| = 12;$

б) $-\sqrt{10^2} = -|10| = -10;$

в) $\sqrt{-10^2}$ выражение не имеет смысла;

г) $-\sqrt{(-11)^2} = -|11| = -11;$

д) $\sqrt{-(-15)^2}$ выражение не имеет смысла;

е) $-\sqrt{(-25)^2} = -|25| = -25.$

473.

а) $3\sqrt{(-2)^6} = 3|(-2)^3| = 3 \cdot 8 = 24;$

б) $-2\sqrt{10^4} = -2 \cdot 10^2 = -200;$

в) $-3\sqrt{5^4} = -3 \cdot 5^2 = -3 \cdot 25 = -75;$

г) $0,1\sqrt{2^{10}} = 0,1 \cdot 2^5 = 0,1 \cdot 32 = 3,2;$

д) $0,1\sqrt{(-3)^8} = 0,1 \cdot (-3^4) = 0,1 \cdot 81 = 8,1;$

е) $100\sqrt{0,1^{10}} = 100 \cdot (0,1)^5 = 100 \cdot 0,00001 = 0,001;$

ж) $-\sqrt{(-2)^{12}} = -(-2)^6 = -64;$

з) $2,5\sqrt{(-0,1)^4} = 2,5 \cdot (0,1)^2 = 2,5 \cdot 0,01 = 0,025.$

474.

а) $\sqrt{4^3} = \sqrt{64} = 8;$

б) $\sqrt{9^5} = 9^2 \cdot 3 = 3^5 = 243;$

в) $\sqrt{16^5} = 16^2 \cdot 4 = 2^{10} = 1024;$

г) $\sqrt{25^3} = \sqrt{25^2 \cdot 25} = 5^3 = 125;$

д) $\sqrt{8 \cdot 162} = \sqrt{2 \cdot 4 \cdot 81 \cdot 2} = \sqrt{81 \cdot 4^2} = 9 \cdot 4 = 36;$

е) $\sqrt{96 \cdot 486} = \sqrt{96 \cdot 6 \cdot 81} = \sqrt{576 \cdot 81} = 24 \cdot 9 = 216;$

ж) $\sqrt{750 \cdot 270} = \sqrt{75 \cdot 27 \cdot 100} = \sqrt{9^2 \cdot 25 \cdot 100} = 9 \cdot 5 \cdot 10 = 450;$

з) $\sqrt{853 \cdot 776} = \sqrt{2^4 \cdot 3^2 \cdot 7^2 \cdot 11^2} = 2^2 \cdot 3 \cdot 7 \cdot 11 = 84 \cdot 11 = 924.$

475*.

Ответ: при $x \geq 0$.

476*.

а) y — любое число;

б) x — любое число;

в) $x \geq 0;$

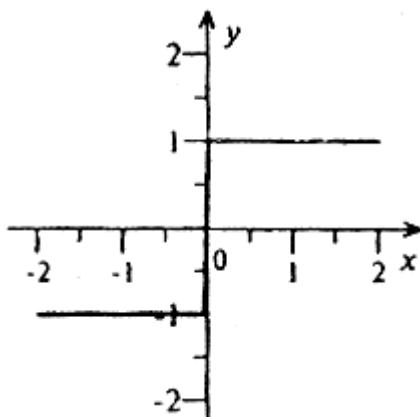
г) $c \leq 0;$

д) $a \leq 0;$

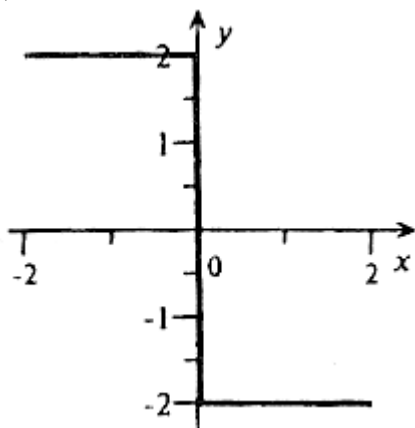
е) b — любое число.

477*.

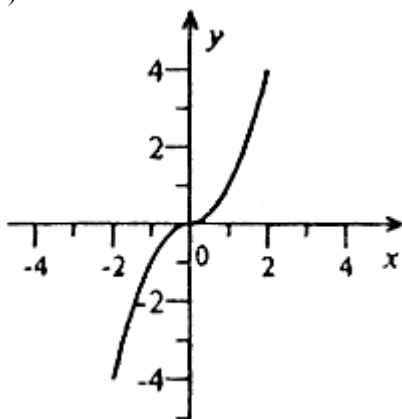
а)



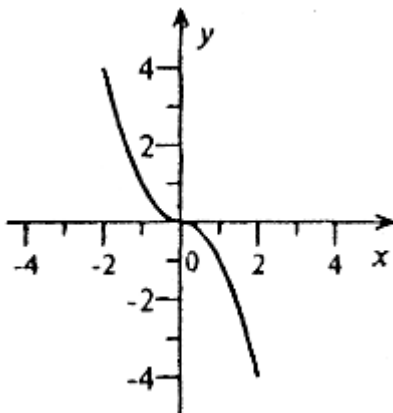
6)



B)



д)



478.

а) $\sqrt{a^4 b^4} = a^2 b^2$;

б) $\sqrt{b^6 c^8} = b^3 c^4$, $b \geq 0$;

в) $\sqrt{16x^4 y^{12}} = 4x^2 y^6$;

г) $\sqrt{0,25 p^2 y^6} = 0,5 p(-y^3) = -0,5 p y^3$, $p \geq 0$, $y \leq 0$;

д) $\sqrt{\frac{p^4}{a^8}} = \frac{p^2}{a^4}$;

е) $\sqrt{\frac{16a^{12}}{b^{10}}} = \frac{4a^6}{b^5}$, $b > 0$;

ж) $\sqrt{\frac{4x^2}{y^6}} = \frac{2(-x)}{-y^3} = \frac{2x}{y^3}$, $x < 0$, $y < 0$;

з) $\sqrt{\frac{c^6}{9a^2}} = \frac{(-c^3)}{3a} = -\frac{c^3}{3a}$, $c < 0$, $a > 0$.

479.

а) $\sqrt{(-a)^2} = \sqrt{a^2} = |a|$;

б) $\sqrt{(-a)^2 (-b)^4} = \sqrt{a^2 b^4} = |ab^2| = |a||b^2| = |a|b^2$.

К ПАРАГРАФУ 7

480.

- а) $0,5\sqrt{60a^2} = 0,5\sqrt{15 \cdot 4a^2} = 0,5 \cdot 2|a|\sqrt{15} = |a|\sqrt{15}$;
б) $2,1\sqrt{300x^4} = 2,1\sqrt{3 \cdot 100x^4} = 2,1 \cdot 10x^2\sqrt{3} = 21x^2\sqrt{3}$;
в) $0,1\sqrt{150x^3} = 0,1\sqrt{25 \cdot 6x^2 \cdot x} = 0,1 \cdot 5|x|\sqrt{6x} = 0,5x\sqrt{6x}$;
г) $0,2\sqrt{225a^5} = 0,2 \cdot 15a^2\sqrt{a} = 3a^2\sqrt{a}$;
д) $a\sqrt{18a^2b} = a\sqrt{9 \cdot 2a^2b} = |a| \cdot 3a\sqrt{2b}$;
е) $-m\sqrt{48am^4} = -m\sqrt{16 \cdot 3am^4} = -m \cdot 4m^2\sqrt{3a} = -4m^3\sqrt{3a}$.

481*.

- а) $\sqrt{9a^2b} = -3a\sqrt{b}$, $a < 0$;
б) $\sqrt{25a^2b^3} = 5ab\sqrt{b}$, $a > 0$;
в) $\sqrt{144a^3b^3} = 12(-a)(-b)\sqrt{ab} = 12ab\sqrt{ab}$, $a < 0$, $b < 0$;
г) $\sqrt{32a^4x^3} = 4a^2|x|\sqrt{2x}$; $4a^2x\sqrt{2x}$, $x > 0$;
д) $\sqrt{-3c^3} = -c\sqrt{-3c}$, $c < 0$;
е) $\sqrt{-5m^7} = -m^3\sqrt{-5m}$, $m < 0$;
ж) $a\sqrt{a^5} = a^3\sqrt{a}$; $a > 0$;
з) $\frac{1}{x}\sqrt{-x^3} = \frac{|x|}{x}\sqrt{-x} = -\sqrt{-x}$, $x < 0$.

482*.

- а) $a\sqrt{3} = \sqrt{3a^2}$, $a \geq 0$;
б) $a\sqrt{3} = -\sqrt{3a^2}$, $a < 0$;
в) $x\sqrt{\frac{2}{x}} = \sqrt{\frac{2x^2}{x}} = \sqrt{2x}$;
г) $x\sqrt{-\frac{2}{x}} = \sqrt{-\frac{2x^2}{x}} = \sqrt{-2x}$.

483*.

- а) Равенство верно при $x \geq 0$;
 б) Равенство верно при $y \leq 0$;
 в) Равенство верно при $c \leq 0$;
 г) Равенство верно при $a \leq 0$;

484*.

а) $x^2 \sqrt{\frac{1}{x}} = \sqrt{\frac{x^4}{x}} = \sqrt{x^3}$;

б) $-x^2 \sqrt{5} = -\sqrt{5x^4}$;

в) $-3a \sqrt{\frac{1}{3}a} = -\sqrt{3a^3}$;

г) $3a \sqrt{-\frac{a}{3}} = -\sqrt{-3a^3}$;

д) $ab \sqrt{\frac{b}{a}} = \sqrt{ab^3}$, $a > 0$, $b > 0$;

е) $2ab \sqrt{\frac{a}{2b}} = \sqrt{2a^3b}$, $a < 0$, $b < 0$;

ж) $\frac{a}{b} \sqrt{\frac{b}{a}} = \sqrt{\frac{a}{b}}$, $a > 0$, $b > 0$;

з) $-ab \sqrt{\frac{1}{a} + \frac{1}{b}} = \sqrt{ab^2 + a^2b}$, $a > 0$, $b < 0$.

487.

а) $\sqrt{x}(\sqrt{a} - \sqrt{b}) = \sqrt{a} \cdot \sqrt{x} - \sqrt{b} \cdot \sqrt{x} = \sqrt{ax} - \sqrt{bx}$;

б) $(\sqrt{x} + \sqrt{y})\sqrt{x} = x + \sqrt{xy}$;

в) $\sqrt{ab}(\sqrt{a} + \sqrt{b}) = \sqrt{ab} \cdot \sqrt{a} + \sqrt{ab} \cdot \sqrt{b} = a\sqrt{b} + b\sqrt{a}$;

г) $(\sqrt{m} - \sqrt{n})\sqrt{mn} = \sqrt{m} \cdot \sqrt{mn} - \sqrt{n} \cdot \sqrt{mn} = m\sqrt{n} - n\sqrt{m}$;

д) $(\sqrt{x} + \sqrt{y})(2\sqrt{x} - \sqrt{y}) = 2\sqrt{x} \cdot \sqrt{x} - \sqrt{x} \cdot \sqrt{y} + 2\sqrt{x} \cdot \sqrt{y} - \sqrt{y} \cdot \sqrt{y} =$
 $= 2x + \sqrt{xy} - y$;

е) $(\sqrt{a} - \sqrt{b})(3\sqrt{a} + 2\sqrt{b}) = 3\sqrt{a} \cdot \sqrt{a} + 2\sqrt{a} \cdot \sqrt{b} - 3\sqrt{a} \cdot \sqrt{b} - 2\sqrt{b} \cdot \sqrt{b} =$
 $= 3a - \sqrt{ab} - 2b$;

ж) $(2\sqrt{a} + \sqrt{b})(3\sqrt{a} - 2\sqrt{b}) =$

$$= 2\sqrt{a} \cdot 3\sqrt{a} - 2\sqrt{a} \cdot 2\sqrt{b} + 3\sqrt{a} \cdot \sqrt{b} - 2\sqrt{b} \cdot \sqrt{b} = 6a - \sqrt{ab} - 2b;$$

$$\begin{aligned} 3) (4\sqrt{x} - \sqrt{2x})(\sqrt{x} - \sqrt{2x}) &= \\ &= 4\sqrt{x} \cdot \sqrt{x} - 4\sqrt{x} \cdot \sqrt{2x} - \sqrt{x} \cdot \sqrt{2x} + \sqrt{2x} \cdot \sqrt{2x} = 6x - 5x\sqrt{2}. \end{aligned}$$

488.

$$a) (1 - \sqrt{x})(1 + \sqrt{x} + x) = 1^3 - (\sqrt{x})^3 = 1 - x\sqrt{x};$$

$$б) (\sqrt{a} + 2)(a - 2\sqrt{a} + 4) = (\sqrt{a})^3 + 2^3 = a\sqrt{a} + 8;$$

$$в) (\sqrt{m} - \sqrt{n})(m + n + \sqrt{mn}) = (\sqrt{m})^3 - (\sqrt{n})^3 = m\sqrt{m} - n\sqrt{n};$$

$$г) (x + \sqrt{y})(x^2 + y - x\sqrt{y}) = x^3 + (\sqrt{y})^3 = x^3 + y\sqrt{y}.$$

489.

$$a) (\sqrt{6+4\sqrt{2}})^2 = (2+\sqrt{2})^2; \quad 6+4\sqrt{2} = 4+2 \cdot 2\sqrt{2} + (\sqrt{2})^2;$$

$$6+4\sqrt{2} = 6+4\sqrt{2}, \text{ тождество доказано};$$

$$б) (\sqrt{8\sqrt{3}+19})^2 = (\sqrt{3}+4)^2; \quad 8\sqrt{3}+19 = (\sqrt{3})^2 + 2 \cdot 4\sqrt{3} + 16;$$

$$8\sqrt{3}+19 = 8\sqrt{3}+19, \text{ тождество доказано}.$$

490.

$$a) \text{ Подставим } x = 1 + \sqrt{5}: \quad x^2 - 6 = (1 + \sqrt{5})^2 - 6 = 1 + 2\sqrt{5} + (\sqrt{5})^2 - 6 = 2\sqrt{5};$$

$$\begin{aligned} б) \text{ Подставим } x = 3 - \sqrt{3}: \quad x^2 - 6x &= (3 - \sqrt{3})^2 - 6(3 - \sqrt{3}) = \\ &= 9 - 2 \cdot 3\sqrt{3} + (\sqrt{3})^2 - 6 \cdot 3 + 6\sqrt{3} = -6; \end{aligned}$$

$$\begin{aligned} в) \text{ Подставим } x = 2 + \sqrt{3}: \quad x^2 - 4x + 3 &= (2 + \sqrt{3})^2 - 4(2 + \sqrt{3}) + 3 = \\ &= 4 + 2 \cdot 2 \cdot \sqrt{3} + (\sqrt{3})^2 - 8 - 4\sqrt{3} + 3 = 4 + 4\sqrt{3} + 3 - 8 - 4\sqrt{3} + 3 = 2; \end{aligned}$$

$$\begin{aligned} г) \text{ Подставим } x = \frac{3 + \sqrt{2}}{2}: \quad x^2 - 3x + 5 &= \left(\frac{3 + \sqrt{2}}{2}\right)^2 - 3\left(\frac{3 + \sqrt{2}}{2}\right) + 5 = \\ &= \frac{9 + 3 \cdot 2\sqrt{2} + (\sqrt{2})^2}{4} - \frac{9 + 3\sqrt{2}}{2} + 5 = \frac{11 + 6\sqrt{2}}{4} - \frac{9 + 3\sqrt{2}}{2} + 5 = \\ &= \frac{11 + 6\sqrt{2} - 18 - 6\sqrt{2} + 20}{4} = \frac{13}{4} = 3,25. \end{aligned}$$

491*.

$$1) (\sqrt{7+4\sqrt{3}} + \sqrt{7-4\sqrt{3}})^2 =$$

$$\begin{aligned}
&= (\sqrt{7+4\sqrt{3}})^2 + 2\sqrt{7+4\sqrt{3}} \cdot \sqrt{7-4\sqrt{3}} + (\sqrt{7-4\sqrt{3}})^2 = \\
&= 7+4\sqrt{3} + 2\sqrt{(7+4\sqrt{3})(7-4\sqrt{3})} + 7-4\sqrt{3} = 14 + 2\sqrt{49-16 \cdot 3} = \\
&= 14 + 2\sqrt{1} = 16;
\end{aligned}$$

$$\begin{aligned}
2) \sqrt{7+4\sqrt{3}} \cdot \sqrt{7-4\sqrt{3}} &= \sqrt{(7+4\sqrt{3})(7-4\sqrt{3})} = \sqrt{49-16 \cdot 3} = \\
&= \sqrt{49-48} = 1 - \text{натуральное число.}
\end{aligned}$$

492.

$$\begin{aligned}
a) \frac{1}{3\sqrt{2}-4} - \frac{1}{3\sqrt{2}+4} &= \frac{3\sqrt{2}+4-3\sqrt{2}+4}{(3\sqrt{2}-4)(3\sqrt{2}+4)} = \frac{8}{(3\sqrt{2})^2-4^2} = \\
&= \frac{8}{9 \cdot 2 - 16} = \frac{8}{2} = 4; - \text{рациональное число;}
\end{aligned}$$

$$\begin{aligned}
б) \frac{1}{5+2\sqrt{6}} + \frac{1}{5-2\sqrt{6}} &= \frac{5-2\sqrt{6}+5+2\sqrt{6}}{(5+2\sqrt{6})(5-2\sqrt{6})} = \frac{10}{25-4 \cdot 6} = \\
&= \frac{10}{1} = 10 - \text{рациональное число.}
\end{aligned}$$

493.

$$\begin{aligned}
a) \frac{1}{11-2\sqrt{30}} - \frac{1}{11+2\sqrt{30}} &= \frac{11+2\sqrt{30}-11+2\sqrt{30}}{(11-2\sqrt{30})(11+2\sqrt{30})} = \frac{4\sqrt{30}}{121-4 \cdot 30} = \\
&= \frac{4\sqrt{30}}{1} = 4\sqrt{30};
\end{aligned}$$

$$\begin{aligned}
б) \frac{5}{3+2\sqrt{2}} + \frac{5}{3-2\sqrt{2}} &= \frac{5(3-2\sqrt{2})-5(3+2\sqrt{2})}{(3+2\sqrt{2})(3-2\sqrt{2})} = \\
&= \frac{15-10\sqrt{2}+15+10\sqrt{2}}{3^2-(2\sqrt{2})^2} = \frac{30}{9-4 \cdot 2} = 30;
\end{aligned}$$

$$\begin{aligned}
в) \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} + \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} &= \frac{(\sqrt{5}-\sqrt{3})^2 + (\sqrt{5}+\sqrt{3})^2}{(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3})} = \\
&= \frac{(\sqrt{5})^2 - 2\sqrt{5} \cdot \sqrt{3} + (\sqrt{3})^2 + (\sqrt{5})^2 + 2\sqrt{5} \cdot \sqrt{3} + (\sqrt{3})^2}{(\sqrt{5})^2 - (\sqrt{3})^2} = \\
&= \frac{16 - 2\sqrt{15} + 2\sqrt{15}}{5-3} = \frac{16}{2} = 8;
\end{aligned}$$

$$\begin{aligned}
 \text{г)} \quad & \frac{11+\sqrt{21}}{11-\sqrt{21}} + \frac{11-\sqrt{21}}{11+\sqrt{21}} = \frac{(11+\sqrt{21})^2 + (11-\sqrt{21})^2}{(11-\sqrt{21})(11+\sqrt{21})} = \\
 & = \frac{11^2 + 2 \cdot 11 \cdot \sqrt{21} + (\sqrt{21})^2 + 11^2 - 2 \cdot 11 \cdot \sqrt{21} + (\sqrt{21})^2}{11^2 - (\sqrt{21})^2} = \\
 & = \frac{121 + 22\sqrt{21} + 21 + 121 - 22\sqrt{21} + 21}{121 - 21} = \frac{284}{100} = 2,84.
 \end{aligned}$$

494.

Подставим $x = 3 + \sqrt{5}$, $y = 3 - \sqrt{5}$:

$$\begin{aligned}
 \frac{x^2 - 3xy + y^2}{x + y + 2} &= \frac{1}{3 + \sqrt{5} + 3 - \sqrt{5} + 2} [(3 + \sqrt{5})^2 - 3(3 + \sqrt{5})(3 - \sqrt{5}) + \\
 &+ (3 - \sqrt{5})^2] = \frac{1}{8} [9 + 2 \cdot 3\sqrt{5} + (\sqrt{5})^2 - 3(9 - (\sqrt{5})^2) + 9 - 2 \cdot 3\sqrt{5} + (\sqrt{5})^2] = \\
 &= \frac{9 + 6\sqrt{5} + 5 - 3(9 - 5) + 9 - 6\sqrt{5} + 5}{8} = \frac{28 - 3 \cdot 4}{8} = \frac{16}{8} = 2.
 \end{aligned}$$

Ответ: 2.

495*.

$$\begin{aligned}
 \text{а)} \quad & \frac{x\sqrt{x} - y\sqrt{y}}{\sqrt{x} - \sqrt{y}} = \frac{(\sqrt{x} - \sqrt{y})(x + \sqrt{xy} + y)}{\sqrt{x} - \sqrt{y}} = x + \sqrt{xy} + y; \\
 \text{б)} \quad & \frac{\sqrt{a} + \sqrt{b}}{a\sqrt{a} + b\sqrt{b}} = \frac{\sqrt{a} + \sqrt{b}}{(\sqrt{a})^3 + (\sqrt{b})^3} = \frac{\sqrt{a} + \sqrt{b}}{(\sqrt{a} + \sqrt{b})(a - \sqrt{ab} + b)} = \frac{1}{a - \sqrt{ab} + b}; \\
 \text{в)} \quad & \frac{2\sqrt{2} - x\sqrt{x}}{2 + \sqrt{2x} + x} = \frac{(\sqrt{2} - \sqrt{x})(2 + \sqrt{2x} + x)}{2 + \sqrt{2x} + x} = \sqrt{2} - \sqrt{x}; \\
 \text{г)} \quad & \frac{a - \sqrt{3a} + 3}{a\sqrt{a} + 3\sqrt{3}} = \frac{a - \sqrt{3a} + 3}{(\sqrt{a})^3 + (\sqrt{3})^3} = \frac{a - \sqrt{3a} + 3}{(\sqrt{a} + \sqrt{3})(a - \sqrt{3a} + 3)} = \frac{1}{\sqrt{a} + \sqrt{3}}.
 \end{aligned}$$

496.

$$\begin{aligned}
 \text{а)} \quad & \frac{\sqrt{70} - \sqrt{30}}{\sqrt{35} - \sqrt{15}} = \frac{\sqrt{2} \cdot \sqrt{35} - \sqrt{2} \cdot \sqrt{15}}{\sqrt{35} - \sqrt{15}} = \frac{\sqrt{2}(\sqrt{35} - \sqrt{15})}{\sqrt{35} - \sqrt{15}} = \sqrt{2}; \\
 \text{б)} \quad & \frac{\sqrt{15} - 5}{\sqrt{6} - \sqrt{10}} = \frac{\sqrt{3} \cdot \sqrt{5} - \sqrt{5} \cdot \sqrt{5}}{\sqrt{2} \cdot \sqrt{3} - \sqrt{2} \cdot \sqrt{5}} = \frac{\sqrt{5}(\sqrt{3} - \sqrt{5})}{\sqrt{2}(\sqrt{3} - \sqrt{5})} = \frac{\sqrt{5}}{\sqrt{2}};
 \end{aligned}$$

$$\begin{aligned}
\text{в)} \quad \frac{2\sqrt{10}-5}{4-\sqrt{10}} &= \frac{2\sqrt{2 \cdot 5} - \sqrt{5} \cdot \sqrt{5}}{2 \cdot 2 - \sqrt{10}} = \frac{\sqrt{5}(2\sqrt{2} - \sqrt{5})}{\sqrt{2}(2\sqrt{2} - \sqrt{5})} = \frac{\sqrt{5}}{\sqrt{2}}; \\
\text{г)} \quad \frac{9-2\sqrt{3}}{3\sqrt{6}-2\sqrt{2}} &= \frac{3 \cdot 3 - 2\sqrt{3}}{3\sqrt{2} \cdot \sqrt{3} - 2\sqrt{2}} = \frac{\sqrt{3}(3\sqrt{3} - 2)}{\sqrt{2}(3\sqrt{3} - 2)} = \frac{\sqrt{3}}{\sqrt{2}}; \\
\text{д)} \quad \frac{2\sqrt{3}+3\sqrt{2}-\sqrt{6}}{2+\sqrt{6}-\sqrt{2}} &= \frac{\sqrt{2} \cdot \sqrt{2} \cdot \sqrt{3} + \sqrt{3} \cdot \sqrt{3} \cdot \sqrt{2} - \sqrt{2} \cdot \sqrt{3}}{\sqrt{2} \cdot \sqrt{2} + \sqrt{2} \cdot \sqrt{3} - \sqrt{2}} = \\
&= \frac{\sqrt{2} \cdot \sqrt{3}(\sqrt{2} + \sqrt{3} - 1)}{\sqrt{2}(\sqrt{2} + \sqrt{3} - 1)} = \sqrt{3}; \\
\text{е)} \quad \frac{(\sqrt{10}-1)^2-3}{\sqrt{10}+\sqrt{3}-1} &= \frac{(\sqrt{10}-1-\sqrt{3})(\sqrt{10}-1+\sqrt{3})}{\sqrt{10}+\sqrt{3}-1} = \sqrt{10}-1-\sqrt{3}.
\end{aligned}$$

497.

$$\begin{aligned}
\text{а)} \quad \frac{1+\sqrt{a}}{\sqrt{a}} &= \frac{(1+\sqrt{a})\sqrt{a}}{\sqrt{a} \cdot \sqrt{a}} = \frac{\sqrt{a}+a}{a}; \\
\text{б)} \quad \frac{y+b\sqrt{y}}{b\sqrt{y}} &= \frac{\sqrt{y}(\sqrt{y}+b)}{b\sqrt{y}} = \frac{y(\sqrt{y}+b)}{by} = \frac{\sqrt{y}+b}{b}; \\
\text{в)} \quad \frac{x-\sqrt{ax}}{a\sqrt{x}} &= \frac{\sqrt{x}(\sqrt{x}-\sqrt{a})}{a \cdot \sqrt{x}} = \frac{\sqrt{x} \cdot \sqrt{x}(\sqrt{x}-\sqrt{a})}{a \cdot \sqrt{x} \cdot \sqrt{x}} = \frac{\sqrt{x}-\sqrt{a}}{a}; \\
\text{г)} \quad \frac{a\sqrt{b}+b\sqrt{a}}{\sqrt{ab}} &= \frac{(a\sqrt{b}+b\sqrt{a})\sqrt{ab}}{\sqrt{ab} \cdot \sqrt{ab}} = \frac{a\sqrt{b} \cdot \sqrt{ab} + b\sqrt{a} \cdot \sqrt{ab}}{ab} = \\
&= \frac{ab\sqrt{a}+ab\sqrt{b}}{ab} = \frac{ab(\sqrt{a}+\sqrt{b})}{ab} = \sqrt{a}+\sqrt{b}; \\
\text{д)} \quad \frac{2\sqrt{3}-3}{5\sqrt{3}} &= \frac{\sqrt{3} \cdot \sqrt{3}(2\sqrt{3}-3)}{5 \cdot \sqrt{3} \cdot \sqrt{3}} = \frac{2-\sqrt{3}}{5}; \\
\text{е)} \quad \frac{2-3\sqrt{2}}{4\sqrt{2}} &= \frac{(2-3\sqrt{2})\sqrt{2}}{4\sqrt{2} \cdot \sqrt{2}} = \frac{2\sqrt{2}-3\sqrt{2} \cdot \sqrt{2}}{4 \cdot 2} = \frac{2\sqrt{2}-3 \cdot 2}{8} = \\
&= \frac{2\sqrt{2}-6}{8} = \frac{\sqrt{2}-3}{4}.
\end{aligned}$$

498.

$$\text{а)} \quad \frac{x-\sqrt{xy}+y}{\sqrt{x}-\sqrt{y}} = \frac{(x-\sqrt{xy}+y)(\sqrt{x}+\sqrt{y})}{(\sqrt{x}-\sqrt{y})(\sqrt{x}+\sqrt{y})} =$$

$$= \frac{x\sqrt{x} - x\sqrt{y} + y\sqrt{x} + x\sqrt{y} - y\sqrt{x} + y\sqrt{x}}{(\sqrt{x})^2 - (\sqrt{y})^2} = \frac{x\sqrt{x} + y\sqrt{y}}{(\sqrt{x})^2 - (\sqrt{y})^2} = \frac{x\sqrt{x} + y\sqrt{y}}{x - y};$$

$$\text{б)} \frac{9 + 3\sqrt{a} + a}{3 + \sqrt{a}} = \frac{(9 + 3\sqrt{a} + a)(3 - \sqrt{a})}{(3 + \sqrt{a})(3 - \sqrt{a})} = \frac{27 - a\sqrt{a}}{3^2 - (\sqrt{a})^2} = \frac{27 - a\sqrt{a}}{9 - a};$$

$$\text{в)} \frac{1 - 2\sqrt{x} + 4x}{1 - 2\sqrt{x}} = \frac{(1 - 2\sqrt{x} + 4x)(1 + 2\sqrt{x})}{(1 - 2\sqrt{x})(1 + 2\sqrt{x})} =$$

$$= \frac{1 - 2\sqrt{x} + 4x + 2\sqrt{x} - 4x + 8x\sqrt{x}}{1^2 - (2\sqrt{x})^2} = \frac{1 + 8x\sqrt{x}}{1^2 - (2\sqrt{x})^2} = \frac{1 + 8x\sqrt{x}}{1 - 4x};$$

$$\text{г)} \frac{a^2b + 2a\sqrt{b} + 4}{a\sqrt{b} + 2} = \frac{(a^2b + 2a\sqrt{b} + 4)(a\sqrt{b} - 2)}{(a\sqrt{b} + 2)(a\sqrt{b} - 2)} = \frac{a^3b\sqrt{b} - 8}{(a\sqrt{b})^2 - 4} =$$

$$= \frac{a^3b\sqrt{b} - 8}{a^2b - 4}.$$

499.

$$\text{а)} \frac{\sqrt{x} - \sqrt{y}}{\sqrt{x}} = \frac{(\sqrt{x} - \sqrt{y})(\sqrt{x} + \sqrt{y})}{\sqrt{x}(\sqrt{x} + \sqrt{y})} = \frac{x - y}{x + \sqrt{xy}};$$

$$\text{б)} \frac{a + \sqrt{b}}{a\sqrt{b}} = \frac{(a + \sqrt{b})(a - \sqrt{b})}{a\sqrt{b}(a - \sqrt{b})} = \frac{a^2 - (\sqrt{b})^2}{a^2\sqrt{b} - ab} = \frac{a^2 - b}{a^2\sqrt{b} - ab};$$

$$\text{в)} \frac{7 - \sqrt{a}}{49 - 7\sqrt{a} + a} = \frac{(7 - \sqrt{a})(7 + \sqrt{a})}{(49 - 7\sqrt{a} + a)(7 + \sqrt{a})} = \frac{(7 - \sqrt{a})(7 + \sqrt{a})}{7^3 + a\sqrt{a}} =$$

$$= \frac{7^2 - (\sqrt{a})^2}{7^3 + a\sqrt{a}} = \frac{49 - a}{343 + a\sqrt{a}};$$

$$\text{г)} \frac{\sqrt{mn} + 1}{mn + \sqrt{mn} + 1} = \frac{(\sqrt{mn} + 1)(\sqrt{mn} - 1)}{(mn + \sqrt{mn} + 1)(\sqrt{mn} - 1)} = \frac{(\sqrt{mn} + 1)(\sqrt{mn} - 1)}{mn\sqrt{mn} - 1} =$$

$$= \frac{(\sqrt{mn})^2 - 1^2}{mn\sqrt{mn} - 1} = \frac{mn - 1}{mn\sqrt{mn} - 1}.$$

500*.

$$\text{а)} \frac{1}{\sqrt{2} + \sqrt{3} + 1} = \frac{\sqrt{2} - (\sqrt{3} + 1)}{[\sqrt{2} + (\sqrt{3} + 1)][\sqrt{2} - (\sqrt{3} + 1)]} = \frac{\sqrt{2} - \sqrt{3} - 1}{(\sqrt{2})^2 - (\sqrt{3} + 1)^2} =$$

$$= \frac{\sqrt{2} - \sqrt{3} - 1}{2 - 4 - 2\sqrt{3}} = \frac{\sqrt{2} - \sqrt{3} - 1}{-2 - 2\sqrt{3}} = \frac{(\sqrt{2} - \sqrt{3} - 1)(1 - \sqrt{3})}{-2(1 + \sqrt{3})(1 - \sqrt{3})} =$$

$$= \frac{\sqrt{2} - \sqrt{3} - 1 - \sqrt{6} + 3 + \sqrt{3}}{-2(1-3)} = \frac{2 + \sqrt{2} - \sqrt{6}}{4};$$

$$\begin{aligned} \text{б)} \quad \frac{1}{\sqrt{5} - \sqrt{3} + 2} &= \frac{\sqrt{5} - (2 - \sqrt{3})}{[\sqrt{5} + (2 - \sqrt{3})][\sqrt{5} - (2 - \sqrt{3})]} = \frac{\sqrt{5} - 2 + \sqrt{3}}{(\sqrt{5})^2 - (2 - \sqrt{3})^2} = \\ &= \frac{\sqrt{5} - 2 + \sqrt{3}}{5 - (4 - 4\sqrt{3} + 3)} = \frac{\sqrt{5} - 2 + \sqrt{3}}{-2 + 4\sqrt{3}} = \frac{(\sqrt{5} - 2 + \sqrt{3})(2\sqrt{3} + 1)}{2(2\sqrt{3} - 1)(2\sqrt{3} + 1)} = \\ &= \frac{2\sqrt{15} - 4\sqrt{3} + 6 + \sqrt{5} - 2 + \sqrt{3}}{2(12 - 1)} = \frac{4 + 2\sqrt{15} + \sqrt{5} - 3\sqrt{3}}{22}. \end{aligned}$$

501*.

$$\frac{\sqrt{x} - \sqrt{2}}{x - 2} = \frac{\sqrt{x} - \sqrt{2}}{(\sqrt{x} - \sqrt{2})(\sqrt{x} + \sqrt{2})} = \frac{1}{\sqrt{x} + \sqrt{2}}.$$

Дробь принимает наибольшее значение, когда ее знаменатель наименьшее, значит $x = 0$.

502.

$$\begin{aligned} \text{а)} \quad 15\sqrt{\frac{2}{5}} - \sqrt{160} &= 15\sqrt{\frac{2}{5}} - \sqrt{16 \cdot 10} = 15\sqrt{\frac{2 \cdot 5}{5 \cdot 5}} - 4\sqrt{10} = \\ &= 3 \cdot \sqrt{\frac{10 \cdot 25}{25}} - 4\sqrt{10} = 3\sqrt{10} - 4\sqrt{10} = -\sqrt{10}; \end{aligned}$$

$$\text{б)} \quad \sqrt{135} + 10\sqrt{0,6} = \sqrt{5 \cdot 27} + 10\sqrt{\frac{3 \cdot 5}{5 \cdot 5}} = 3\sqrt{15} + 2\sqrt{15} = 5\sqrt{15};$$

$$\begin{aligned} \text{в)} \quad 6\sqrt{1\frac{1}{3}} - \sqrt{27} &= 6\sqrt{\frac{4}{3}} - \sqrt{9 \cdot 3} = 6 \cdot 2\sqrt{\frac{1}{3}} - 3\sqrt{3} = 6 \cdot 2\sqrt{\frac{1 \cdot 3}{3 \cdot 3}} - 3\sqrt{3} = \\ &= \frac{12}{2}\sqrt{3} - 3\sqrt{3} = \sqrt{3}; \end{aligned}$$

$$\begin{aligned} \text{г)} \quad 0,5\sqrt{24} + 10\sqrt{\frac{3}{8}} &= 0,5\sqrt{4 \cdot 6} + 10\sqrt{\frac{3}{2 \cdot 4}} = 0,5 \cdot 2\sqrt{6} + \frac{10}{2}\sqrt{\frac{3 \cdot 2}{2 \cdot 2}} = \\ &= \sqrt{6} + 2,5\sqrt{6} = 3,5\sqrt{6}. \end{aligned}$$

503*.

$$\text{а)} \quad \left(\frac{1}{x + x\sqrt{y}} + \frac{1}{x - x\sqrt{y}} \right) \cdot \frac{y-1}{2} = \frac{x - x\sqrt{y} + x + x\sqrt{y}}{(x + x\sqrt{y})(x - x\sqrt{y})} \cdot \frac{y-1}{2} =$$

$$= \frac{2x}{x^2 - (x\sqrt{y})^2} \cdot \frac{y-1}{2} = \frac{2x(y-1)}{2x^2(1-y)} = -\frac{y-1}{x(y-1)} = -\frac{1}{x};$$

$$\begin{aligned} 6) & \left(\frac{\sqrt{a}}{\sqrt{a}-\sqrt{b}} - \frac{\sqrt{a}}{\sqrt{a}+\sqrt{b}} \right) \cdot \frac{(b-a)^2}{2} = \\ &= \frac{\sqrt{a}(\sqrt{a}+\sqrt{b}) - \sqrt{a}(\sqrt{a}-\sqrt{b})}{(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})} \cdot \frac{(b-a)^2}{2} = \frac{2\sqrt{ab}}{(a-b)} \cdot \frac{(b-a)^2}{2} = \\ &= \frac{2\sqrt{ab} \cdot (a-b)^2}{(a-b) \cdot 2} = \sqrt{ab}(a-b). \end{aligned}$$