



Свойства арифметического квадратного корня

Домашняя работа

1. Корень из точной степени

1.1. Найдите значение корня:

- | | | | |
|----------------------|-------------------------|-------------------------|----------------------------|
| 1) $\sqrt{(-2)^2}$; | 4) $\sqrt{(-1)^{10}}$; | 7) $\sqrt{(-5)^2}$; | 10) $\sqrt{(-1)^{16}}$; |
| 2) $\sqrt{5^6}$; | 5) $\sqrt{0,1^8}$; | 8) $\sqrt{9^4}$; | 11) $\sqrt{(-0,3)^6}$; |
| 3) $\sqrt{(-6)^4}$; | 6) $\sqrt{(-1)^{8n}}$; | 9) $\sqrt{(-2)^{10}}$; | 12) $\sqrt{(-1)^{8n+2}}$. |

1.2. Найдите значение корня

- | | |
|----------------------|----------------------|
| 1) $\sqrt{11025}$; | 4) $\sqrt{129600}$; |
| 2) $\sqrt{65536}$; | 5) $\sqrt{59049}$; |
| 3) $\sqrt{105625}$; | 6) $\sqrt{73984}$. |

1.3. Найдите значение выражения

- | | |
|--|---|
| 1) $\sqrt{(1-\sqrt{3})^2}$; | 5) $\sqrt{(\sqrt{3}-2)^2}$; |
| 2) $\sqrt{(\sqrt{5}-\sqrt{7})^2}$; | 6) $\sqrt{(\sqrt{15}-\sqrt{17})^2}$; |
| 3) $\sqrt{(2\sqrt{7}-1)^2}$; | 7) $\sqrt{(2\sqrt{3}-4)^2}$; |
| 4) $\sqrt{(1-\sqrt{5})^2} + \sqrt{(3-\sqrt{5})^2}$; | 8) $\sqrt{(\sqrt{6}-5)^2} - \sqrt{(\sqrt{6}-11)^2}$. |

1.4. Найдите значение выражения:

1) $\sqrt{61^2 - 60^2}$;

4) $\sqrt{25^2 - 24^2}$;

2) $\sqrt{17,4^2 - 12,6^2}$;

5) $\sqrt{29^2 - 21^2}$;

3) $\sqrt{\frac{45^2 - 19^2}{125,5^2 - 99,5^2}}$;

6) $\sqrt{\frac{15^2 - 7^2}{46^2 - 35^2}}$.

2. Корень из произведения и частного

2.1. Найдите значение выражения:

1) $\sqrt{25 \cdot 121}$;

6) $\sqrt{49 \cdot 144}$;

2) $\sqrt{900 \cdot 0,16}$;

7) $\sqrt{625 \cdot 0,09}$;

3) $\sqrt{0,81 \cdot 2,25}$;

8) $\sqrt{0,36 \cdot 1,69}$;

4) $\sqrt{14^2 \cdot 5^4}$;

9) $\sqrt{15^2 \cdot 2^6}$;

5) $\sqrt{0,04 \cdot 0,49 \cdot 3600}$;

10) $\sqrt{0,64 \cdot 0,01 \cdot 2500}$.

2.2. Найдите значение выражения:

1) $\sqrt{\frac{64}{25}}$;

6) $\sqrt{\frac{81}{49}}$;

2) $\sqrt{13\frac{4}{9}}$;

7) $\sqrt{8\frac{8}{49}}$;

3) $\sqrt{3\frac{6}{25} \cdot 3\frac{1}{16}}$;

8) $\sqrt{1\frac{15}{49} \cdot 4\frac{21}{25}}$;

4) $\sqrt{\frac{1}{25} \cdot 0,16 \cdot 49}$;

9) $\sqrt{\frac{1}{16} \cdot 0,81 \cdot 121}$;

5) $\sqrt{6\frac{1}{4} \cdot 5\frac{4}{9} \cdot 1\frac{11}{25}}$;

10) $\sqrt{3\frac{1}{16} \cdot 7\frac{1}{9} \cdot 1\frac{32}{49}}$.

2.3. Найдите значение выражения

1) $\sqrt{75} \cdot \sqrt{3}$;

6) $\sqrt{50} \cdot \sqrt{8}$;

2) $\sqrt{0,049} \cdot \sqrt{10}$;

7) $\sqrt{0,32} \cdot \sqrt{200}$;

3) $\sqrt{7} \cdot \sqrt{3} \cdot \sqrt{21}$;

8) $\sqrt{5} \cdot \sqrt{12} \cdot \sqrt{15}$;

4) $\sqrt{5,2} \cdot \sqrt{3\frac{1}{13}}$;

9) $\sqrt{7,2} \cdot \sqrt{2\frac{2}{9}}$;

5) $\sqrt{2^5 \cdot 5} \cdot \sqrt{2 \cdot 5^3}$;

10) $\sqrt{3^5 \cdot 2} \cdot \sqrt{2^7 \cdot 3}$.

2.4. Найдите значение выражения

1) $\frac{\sqrt{48}}{\sqrt{3}}$;

6) $\frac{\sqrt{27}}{\sqrt{75}}$;

2) $\frac{\sqrt{9,8}}{\sqrt{0,2}}$;

7) $\frac{\sqrt{5,4}}{\sqrt{0,6}}$;

3) $\frac{\sqrt{75}}{\sqrt{108}}$;

8) $\frac{\sqrt{32}}{\sqrt{50}}$;

4) $\frac{\sqrt{7} \cdot \sqrt{14}}{\sqrt{2}}$;

9) $\frac{\sqrt{8} \cdot \sqrt{24}}{\sqrt{3}}$;

5) $\frac{\sqrt{12}}{\sqrt{15} \cdot \sqrt{5}}$;

10) $\frac{\sqrt{45}}{\sqrt{35} \cdot \sqrt{7}}$.

2.5. Найдите значение выражения, разложив числа под корнем на множители:

1) $\sqrt{48 \cdot 27}$;

3) $\sqrt{8,1 \cdot 0,4}$;

5) $\sqrt{54 \cdot 96}$.

2) $\sqrt{7,5 \cdot 0,3}$;

4) $\sqrt{22,5 \cdot 40}$;

3. Работа с переменными

3.1. Замените выражение тождественно равным, не содержащим знака корня:

- 1) $\sqrt{t^2}$; 3) $\sqrt{m^{14}}$; 5) $\sqrt{l^2}$; 7) $2\sqrt{x^6}$;
2) $2,5\sqrt{x^2}$; 4) $-\sqrt{k^4}$; 6) $-0,8\sqrt{t^2}$; 8) $-\sqrt{a^{12}}$.

3.2. При каких значениях переменных x , a , b выполняется равенство?

- 1) $\sqrt{x^2} = x$; 2) $\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$; 3) $\sqrt{x^2} = -x$; 4) $\sqrt{a \cdot b} = \sqrt{-a} \cdot \sqrt{-b}$.

3.3. Упростите выражение:

- 1) $\sqrt{t^2}$, если $t \geq 0$; 7) $\sqrt{\frac{1}{9}a^2b^8}$, если $a \geq 0$;
2) $\sqrt{x^2}$, если $x \leq 0$; 8) $\sqrt{36m^4n^{14}}$, если $n \leq 0$;
3) $\sqrt{9a^2}$, если $a \leq 0$; 9) $-2,5t\sqrt{16t^6}$, если $t \leq 0$;
4) $\sqrt{0,25c^2}$, если $c \geq 0$; 10) $\frac{\sqrt{x^{14}y^{12}z^6}}{x^4y^3z}$, если $x < 0$, $z > 0$;
5) $\sqrt{x^{16}}$; 11) $\frac{1,8a^3}{b^{11}} \cdot \sqrt{\frac{4b^{18}}{9a^{24}}}$, если $b < 0$.
6) $\sqrt{81m^6}$, если $m \leq 0$;

3.4. Упростите выражение:

- 1) $\sqrt{(m+1)^2}$ 4) $(a-7) \cdot \sqrt{\frac{25}{(7-a)^2}}$, если $a > 7$;
2) $\sqrt{(x-8)^2}$, если $x \geq 8$; 5) $\frac{x^2+4x+4}{x-2} \cdot \sqrt{\frac{(x-2)^6}{(x+2)^2}}$, если $x < -2$;
3) $\sqrt{(t+2)^2}$, если $t \leq -2$; 6) $\frac{t^2-9}{(t+9)^2} \cdot \sqrt{\frac{t^2+18t+81}{(t-3)^2}}$, если $t < -9$.



Свойства арифметического квадратного корня

Ответы

1. Корень из точной степени

1.1.

1) 2. 2) 125. 3) 36. 4) 1. 5) 0,0001. 6) 1.

7) 5. 8) 81. 9) 32. 10) 1. 11) 0,027. 12) 1.

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

$$\sqrt{(-5)^2} = |-5| = 5;$$

$$\sqrt{5^6} = |5^3| = |125| = 125;$$

$$\sqrt{9^4} = |9^2| = |81| = 81;$$

$$\sqrt{(-6)^4} = |(-6)^2| = |36| = 36;$$

$$\sqrt{(-2)^{10}} = |(-2)^5| = |-32| = 32;$$

$$\sqrt{(-1)^{10}} = |(-1)^5| = |-1| = 1;$$

$$\sqrt{(-1)^{16}} = |(-1)^8| = |1| = 1;$$

$$\sqrt{0,1^8} = |0,1^4| = |0,0001| = 0,0001.$$

$$\sqrt{(-0,3)^6} = |(-0,3)^3| = |-0,027| = 0,027.$$

$$\begin{aligned}\sqrt{(-1)^{8n}} &= |(-1)^{4n}| = |((-1)^{2n})^2| = \\ &= |1^{2n}| = |1| = 1;\end{aligned}$$

$$\begin{aligned}\sqrt{(-1)^{8n+2}} &= |(-1)^{4n+1}| = \\ &= |(-1)^{4n} \cdot (-1)^1| = |1 \cdot (-1)| = |-1| = 1.\end{aligned}$$

1.2.

1) 105. 2) 256. 3) 325. 4) 360. 5) 243. 6) 272.

$$\begin{array}{r} 11025 \overline{) 25} \\ \underline{-100} \\ 102 \overline{) 9} \\ \underline{-100} \\ 2 \end{array}$$

$$\begin{aligned} 11025 &= 25 \cdot 9 \cdot 49 = \\ &= 5^2 \cdot 3^2 \cdot 7^2 = \\ &= (5 \cdot 3 \cdot 7)^2 = \\ &= 105^2. \end{aligned}$$

$$\sqrt{11025} = \sqrt{105^2} = |105| = 105;$$

$$\begin{array}{r} 129600 \overline{) 100} \\ \underline{-1296} \\ 12 \overline{) 4} \\ \underline{-09} \\ 3 \overline{) 4} \\ \underline{-32} \\ 8 \overline{) 81} \\ \underline{-80} \\ 1 \end{array}$$

$$\begin{aligned} 129600 &= 100 \cdot 4 \cdot 4 \cdot 81 = \\ &= 10^2 \cdot 4^2 \cdot 9^2 = \\ &= (10 \cdot 4 \cdot 9)^2 = \\ &= 360^2. \end{aligned}$$

$$\sqrt{129600} = \sqrt{360^2} = |360| = 360.$$

$$\begin{array}{r} 65536 \overline{) 4} \\ \underline{-4} \\ 25 \overline{) 16384} \\ \underline{-24} \\ 15 \overline{) 4096} \\ \underline{-12} \\ 33 \overline{) 1024} \\ \underline{-32} \\ 2 \overline{) 24} \\ \underline{-2} \\ 2 \overline{) 8} \\ \underline{-2} \\ 0 \end{array}$$

$$\begin{aligned} 65536 &= 4 \cdot 4 \cdot 4 \cdot 1024 = \\ &= 4^3 \cdot 2^{10} = (2^2)^3 \cdot 2^{10} = \\ &= 2^6 \cdot 2^{10} = 2^{16}; \end{aligned}$$

$$\sqrt{65536} = \sqrt{2^{16}} = |2^8| = |256| = 256.$$

$$\begin{array}{r} 59049 \overline{) 9} \\ \underline{-54} \\ 50 \overline{) 6561} \\ \underline{-45} \\ 54 \overline{) 729} \\ \underline{-54} \\ 09 \overline{) 81} \\ \underline{-09} \\ 00 \end{array}$$

$$\begin{aligned} 59049 &= 9 \cdot 9 \cdot 9 \cdot 81 = \\ &= 9^3 \cdot 9^2 = 9^5 = \\ &= (3^2)^5 = 3^{10}; \end{aligned}$$

$$\sqrt{59049} = |3^{10}| = |243| = 243.$$

$$\begin{array}{r} 105625 \overline{) 25} \\ \underline{-100} \\ 56 \overline{) 4225} \\ \underline{-50} \\ 62 \overline{) 169} \\ \underline{-50} \\ 12 \end{array}$$

$$\begin{aligned} 105625 &= 25 \cdot 25 \cdot 169 = \\ &= 25^2 \cdot 13^2 = \\ &= (25 \cdot 13)^2 = 325^2; \end{aligned}$$

$$\sqrt{105625} = \sqrt{325^2} = |325| = 325.$$

$$\begin{array}{r} 43984 \overline{) 16} \\ \underline{-64} \\ 99 \overline{) 4624} \\ \underline{-96} \\ 38 \overline{) 1156} \\ \underline{-32} \\ 64 \overline{) 289} \\ \underline{-64} \\ 24 \overline{) 81} \\ \underline{-20} \\ 4 \end{array}$$

$$\begin{aligned} 43984 &= 16 \cdot 4 \cdot 4 \cdot 289 = \\ &= 16^2 \cdot 17^2 = (16 \cdot 17)^2 = \\ &= 272^2; \end{aligned}$$

$$\sqrt{43984} = \sqrt{272^2} = |272| = 272.$$

1.3.

1) $\sqrt{3}-1$. 2) $\sqrt{7}-\sqrt{5}$. 3) $2\sqrt{7}-1$. 4) 2.

5) $2-\sqrt{3}$. 6) $\sqrt{17}-\sqrt{15}$. 7) $4-2\sqrt{3}$. 8) -6.

$$\sqrt{(1-\sqrt{3})^2} = |1-\sqrt{3}| = -(1-\sqrt{3}) = \sqrt{3}-1; \quad \sqrt{(\sqrt{3}-2)^2} = |\sqrt{3}-2| = 2-\sqrt{3};$$

$$\sqrt{(\sqrt{5}-\sqrt{7})^2} = |\sqrt{5}-\sqrt{7}| = \sqrt{7}-\sqrt{5}; \quad \sqrt{(\sqrt{15}-\sqrt{17})^2} = |\sqrt{15}-\sqrt{17}| = \sqrt{17}-\sqrt{15};$$

$$\sqrt{(2\sqrt{7}-1)^2} = |2\sqrt{7}-1| = 2\sqrt{7}-1; \quad \sqrt{(2\sqrt{3}-4)^2} = |2\sqrt{3}-4| = 4-2\sqrt{3};$$

$$\begin{aligned} \sqrt{(1-\sqrt{5})^2} + \sqrt{(3-\sqrt{5})^2} &= |1-\sqrt{5}| + |3-\sqrt{5}| = \\ &= \sqrt{5}-1 + 3-\sqrt{5} = 2; \end{aligned} \quad \begin{aligned} \sqrt{(6-5)^2} - \sqrt{(6-11)^2} &= |\sqrt{6}-5| - |\sqrt{6}-11| = \\ &= 5-\sqrt{6} + \sqrt{6}-11 = -6. \end{aligned}$$

1.4.

1) 11. 2) 12. 3) $\frac{8}{15}$. 4) 7. 5) 20. 6) $\frac{4}{9}$.

$$\sqrt{64^2-60^2} = \sqrt{(64-60)(64+60)} = \sqrt{4 \cdot 124} = \sqrt{496} = 11;$$

$$\sqrt{174^2-126^2} = \sqrt{(174-126)(174+126)} = \sqrt{48 \cdot 300} = \sqrt{14400} = 120.$$

$$\begin{aligned} \sqrt{\frac{45^2-19^2}{1255^2-995^2}} &= \sqrt{\frac{(45-19)(45+19)}{(1255-995)(1255+995)}} = \\ &= \sqrt{\frac{26 \cdot 64}{26 \cdot 225}} = \sqrt{\frac{8^2}{15^2}} = \sqrt{\left(\frac{8}{15}\right)^2} = \left|\frac{8}{15}\right| = \frac{8}{15}; \end{aligned}$$

$$\sqrt{25^2-24^2} = \sqrt{(25-24)(25+24)} = \sqrt{1 \cdot 49} = 7;$$

$$\sqrt{29^2-21^2} = \sqrt{(29-21)(29+21)} = \sqrt{8 \cdot 50} = \sqrt{400} = 20;$$

$$\begin{aligned} \sqrt{\frac{15^2-7^2}{46^2-35^2}} &= \sqrt{\frac{(15-7)(15+7)}{(46-35)(46+35)}} = \\ &= \sqrt{\frac{8 \cdot 22}{11 \cdot 81}} = \sqrt{\frac{16}{81}} = \frac{4}{9}. \end{aligned}$$

2. Корень из произведения и частного

2.1.

1) 55. 2) 12. 3) 1,35. 4) 350. 5) 8,4.

6) 84. 7) 7,5. 8) 0,78. 9) 120. 10) 4.

$$\begin{array}{l|l} \sqrt{25 \cdot 121} = 5 \cdot 11 = 55; & \sqrt{49 \cdot 144} = 7 \cdot 12 = 84; \\ \sqrt{900 \cdot 0,16} = 30 \cdot 0,4 = 12; & \sqrt{625 \cdot 0,09} = 25 \cdot 0,3 = 7,5; \\ \sqrt{0,81 \cdot 2,25} = 0,9 \cdot 1,5 = 1,35; & \sqrt{0,36 \cdot 1,69} = 0,6 \cdot 1,3 = 0,78; \\ \sqrt{14^2 \cdot 5^4} = 14 \cdot 5^2 = 350 & \sqrt{15^2 \cdot 2^6} = 15 \cdot 2^3 = 120; \\ \sqrt{0,04 \cdot 0,49 \cdot 3600} = & \sqrt{0,64 \cdot 0,01 \cdot 2500} = \\ = 0,2 \cdot 0,7 \cdot 60 = 8,4 & = 0,8 \cdot 0,1 \cdot 50 = 4. \end{array}$$

2.2.

1) $\frac{8}{5}$. 2) $\frac{11}{3}$. 3) $\frac{63}{20}$. 4) $\frac{14}{25}$. 5) 7.

6) $\frac{9}{7}$. 7) $\frac{20}{7}$. 8) $\frac{88}{35}$. 9) $\frac{99}{40}$. 10) 6.

$$\begin{array}{l|l} \sqrt{\frac{64}{25}} = \frac{\sqrt{64}}{\sqrt{25}} = \frac{8}{5}; & \sqrt{\frac{81}{49}} = \frac{\sqrt{81}}{\sqrt{49}} = \frac{9}{7}; \\ \sqrt{12\frac{4}{9}} = \sqrt{\frac{121}{9}} = \frac{11}{3}; & \sqrt{8\frac{8}{49}} = \sqrt{\frac{400}{49}} = \frac{20}{7}; \\ \sqrt{\frac{36}{25} \cdot \frac{1}{16}} = \sqrt{\frac{81 \cdot 49}{25 \cdot 16}} = \frac{9}{5} \cdot \frac{7}{4} = \frac{63}{20}; & \sqrt{1\frac{15}{49} \cdot 4\frac{1}{25}} = \sqrt{\frac{64 \cdot 121}{49 \cdot 25}} = \frac{8}{7} \cdot \frac{11}{5} = \frac{88}{35}; \\ \sqrt{\frac{1}{25} \cdot 0,16 \cdot 49} = \frac{1}{5} \cdot 0,4 \cdot 7 = \frac{14}{25}; & \sqrt{\frac{1}{16} \cdot 0,81 \cdot 121} = \frac{1}{4} \cdot 0,9 \cdot 11 = \frac{99}{40}; \\ \sqrt{6\frac{1}{4} \cdot 5\frac{4}{9} \cdot 1\frac{11}{25}} = \sqrt{\frac{25 \cdot 49 \cdot 36}{4 \cdot 9 \cdot 25}} = 7; & \sqrt{3\frac{1}{16} \cdot 7\frac{1}{9} \cdot 1\frac{32}{49}} = \sqrt{\frac{49 \cdot 64 \cdot 81}{16 \cdot 9 \cdot 49}} = \sqrt{36} = 6. \end{array}$$

2.3.

1) 15. 2) 0,7. 3) 21. 4) 4. 5) 200.

6) 20. 7) 8. 8) 30. 9) 4. 10) 432.

$$\sqrt{45} \cdot \sqrt{3} = \sqrt{45 \cdot 3} = \sqrt{225} = 15;$$

$$\sqrt{50} \cdot \sqrt{8} = \sqrt{50 \cdot 8} = \sqrt{400} = 20;$$

$$\sqrt{0,049} \cdot \sqrt{10} = \sqrt{0,49} = 0,7;$$

$$\sqrt{0,32} \cdot \sqrt{200} = \sqrt{64} = 8;$$

$$\sqrt{7} \cdot \sqrt{3} \cdot \sqrt{21} = \sqrt{21 \cdot 21} = |21| = 21;$$

$$\sqrt{5} \cdot \sqrt{12} \cdot \sqrt{15} = \sqrt{60 \cdot 15} = \sqrt{900} = 30;$$

$$\sqrt{5,2} \cdot \sqrt{3 \frac{1}{13}} = \sqrt{\frac{52}{10} \cdot \frac{40}{13}} = \sqrt{16} = 4;$$

$$\sqrt{7,2} \cdot \sqrt{2 \frac{2}{9}} = \sqrt{\frac{72}{10} \cdot \frac{20}{9}} = \sqrt{16} = 4;$$

$$\sqrt{2^5 \cdot 5} \cdot \sqrt{2 \cdot 5^3} = \sqrt{2^6 \cdot 5^4} = 2^3 \cdot 5^2 = 200$$

$$\sqrt{3^5 \cdot 2} \cdot \sqrt{2^7 \cdot 3} = \sqrt{2^8 \cdot 3^6} = 2^4 \cdot 3^3 = 432.$$

2.4.

1) 4. 2) 7. 3) $\frac{5}{6}$. 4) 7. 5) $\frac{2}{5}$.

6) $\frac{3}{5}$. 7) 3. 8) $\frac{4}{5}$. 9) 8. 10) $\frac{3}{7}$.

$$\frac{\sqrt{48}}{\sqrt{3}} = \sqrt{\frac{48}{3}} = \sqrt{16} = 4;$$

$$\frac{\sqrt{27}}{\sqrt{75}} = \sqrt{\frac{27}{75}} = \sqrt{\frac{9}{25}} = \frac{3}{5};$$

$$\frac{\sqrt{9,8}}{\sqrt{0,2}} = \sqrt{\frac{9,8}{0,2}} = \sqrt{49} = 7;$$

$$\frac{\sqrt{5,4}}{\sqrt{0,6}} = \sqrt{\frac{5,4}{0,6}} = \sqrt{9} = 3;$$

$$\frac{\sqrt{45}}{\sqrt{108}} = \sqrt{\frac{45}{108}} = \frac{5}{6};$$

$$\frac{\sqrt{32}}{\sqrt{50}} = \sqrt{\frac{32}{50}} = \frac{4}{5};$$

$$\frac{\sqrt{7} \cdot \sqrt{14}}{\sqrt{2}} = \sqrt{\frac{7 \cdot 14}{2}} = \sqrt{49} = 7;$$

$$\frac{\sqrt{8} \cdot \sqrt{24}}{\sqrt{3}} = \sqrt{\frac{8 \cdot 24}{3}} = \sqrt{64} = 8;$$

$$\frac{\sqrt{12}}{\sqrt{15} \cdot \sqrt{5}} = \sqrt{\frac{12}{15 \cdot 5}} = \frac{2}{5};$$

$$\frac{\sqrt{45}}{\sqrt{35} \cdot \sqrt{7}} = \sqrt{\frac{45}{35 \cdot 7}} = \frac{3}{7};$$

2.5.

1) 36. 2) 1,5. 3) 1,8. 4) 30. 5) 72.

$$\sqrt{48 \cdot 27} = \sqrt{16 \cdot 3 \cdot 9 \cdot 3} = \sqrt{2^4 \cdot 3^4} = 2^2 \cdot 3^2 = 36;$$

$$\sqrt{75,09} = \sqrt{\frac{75}{10} \cdot \frac{9}{10}} = \sqrt{\frac{5^2 \cdot 3^2}{10^2}} = \frac{5 \cdot 3}{10} = 1,5;$$

$$\sqrt{81 \cdot 0,4} = \sqrt{\frac{81}{10} \cdot \frac{4}{10}} = \sqrt{\frac{9^2 \cdot 2^2}{10^2}} = \frac{9 \cdot 2}{10} = 1,8;$$

$$\sqrt{225 \cdot 40} = \sqrt{\frac{225}{10} \cdot \frac{40}{1}} = \sqrt{15^2 \cdot 2^2} = 15 \cdot 2 = 30;$$

$$\sqrt{54 \cdot 96} = \sqrt{2 \cdot 27 \cdot 6 \cdot 16} = \sqrt{3^4 \cdot 2^6} = 3^2 \cdot 2^3 = 72;$$

3. Работа с переменными

3.1.

1) $|t|$. 2) $2,5|x|$. 3) $m^6 \cdot |m|$. 4) $-k^2$. 5) $|l|$. 6) $-0,8|t|$. 7) $2x^2 \cdot |x|$. 8) $-a^6$.

$$\sqrt{t^2} = |t|;$$

$$2,5\sqrt{x^2} = 2,5|x|;$$

$$\sqrt{m^6} = |m^3| = |m^6 \cdot m| = m^6 \cdot |m|;$$

$$-\sqrt{k^4} = -|k^2| = -k^2;$$

$$\sqrt{l^2} = |l|;$$

$$-0,8\sqrt{t^2} = -0,8|t|;$$

$$2\sqrt{x^6} = 2|x^3| = 2 \cdot |x^2 \cdot x| = 2x^2 \cdot |x|;$$

$$-\sqrt{a^6} = -|a^3| = -a^3;$$

3.2.

1) $x \geq 0$. 2) $a \geq 0, b \geq 0$. 3) $x \leq 0$. 4) $a \leq 0, b \leq 0$.

$$\sqrt{x^2} = x \quad ?$$

$$\sqrt{x^2} = -x \quad ?$$

$$\sqrt{x^2} = |x|$$

$$\sqrt{x^2} = |x|$$

$$|x| = x \Rightarrow x \geq 0$$

$$|x| = -x \Rightarrow x \leq 0.$$

$$\sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$$

$$\sqrt{a \cdot b} = \sqrt{-a} \cdot \sqrt{-b}$$

$$\sqrt{a} \Rightarrow a \geq 0 \quad \left| \Rightarrow a \cdot b \geq 0 \right.$$

$$\sqrt{-a} \Rightarrow -a \geq 0; \quad a \leq 0$$

$$\sqrt{b} \Rightarrow b \geq 0$$

$$\sqrt{-b} \Rightarrow -b \geq 0; \quad b \leq 0.$$

3.3.

1) t . 2) $-x$. 3) $-3a$. 4) $0,5c$. 5) x^8 . 6) $-9m^3$.

7) $\frac{1}{3}ab^4$. 8) $-6m^2n^7$. 9) $10t^4$. 10) $-x^3y^3z^2$. 11) $-\frac{1,2}{a^9b^2}$.

1) $\sqrt{t^2} = |t| = t \quad (t \geq 0)$

2) $\sqrt{x^2} = |x| = -x \quad (x \leq 0)$

3) $\sqrt{9a^2} = |3a| = 3|a| = -3a \quad (a \leq 0)$

4) $\sqrt{0,25c^2} = |0,5c| = 0,5|c| = 0,5c \quad (c \geq 0)$

5) $\sqrt{x^{16}} = |x^8| = x^8 \quad (x^8 \geq 0)$

6) $\sqrt{81m^6} = |9 \cdot m^3| = 9|m^3| = (m \leq 0)$
 $= 9 \cdot |m^2 \cdot m| = 9m^2 \cdot |m| = -9m^3$

7) $\sqrt{\frac{1}{9}a^2b^8} = \frac{1}{3} \cdot |a| \cdot |b^4| = \frac{1}{3}ab^4 \quad (a \geq 0)$

8) $\sqrt{36m^4n^{14}} = 6 \cdot |m^2| \cdot |n^7| = -6m^2n^7 \quad (n \leq 0)$

9) $-2,5t \sqrt{16t^6} = -2,5t \cdot 4|t^3| = (t \leq 0)$
 $= -10t \cdot (-t^3) = 10t^4;$

10) $\frac{\sqrt{x^{14}y^{12}z^6}}{x^4y^3z} = \frac{|x^7| \cdot |y^6| \cdot |z^3|}{x^4 \cdot y^3 \cdot z} \quad (x \leq 0,$
 $z \geq 0)$
 $= \frac{(-x^7) \cdot y^6 \cdot z^3}{x^4 \cdot y^3 \cdot z} = -x^3 \cdot y^3 \cdot z^2;$

11) $\frac{1,8a^3}{b^{11}} \cdot \sqrt{4b^{18}} = \frac{1,8a^3 \cdot 2 \cdot |b^9|}{b^{11} \cdot 3 \cdot |a^{12}|} =$
 $= \frac{1,2 \cdot a^3 \cdot (-b^9)}{b^{11} \cdot a^{12}} = -\frac{1,2}{a^9 \cdot b^2};$

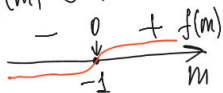
3.4.

1) $|m+1|$. 2) $x-8$. 3) $-t-2$. 4) 5 . 5) $(x+2) \cdot (x-2)^2$. 6) $\frac{t+3}{(t+9)(3-t)}$.

1) $\sqrt{(m+1)^2} = |m+1| = \begin{cases} m+1, & \text{если } m \geq -1 \\ -m-1, & \text{если } m < -1 \end{cases}$

$f(m) = m+1$

$f(m) = 0 \Rightarrow m = -1$



2) $\sqrt{(x-8)^2} = |x-8| = x-8 \quad (x \geq 8)$

3) $\sqrt{(t+2)^2} = |t+2| = -t-2 \quad (t \leq -2)$

4) $(a-7) \cdot \sqrt{\frac{25}{(7-a)^2}} = \frac{a-7}{1} \cdot \frac{5}{|7-a|} =$
 $= \frac{a-7}{1} \cdot \frac{5}{a-7} = 5 \quad (a > 7)$

5) $\frac{x^2+4x+4}{x-2} \cdot \sqrt{\frac{(x-2)^6}{(x+2)^2}} = (x < -2)$
 $= \frac{(x+2)^2}{x-2} \cdot \frac{|x-2|^3}{|x+2|} = \frac{(x+2)^2 \cdot (-(x-2)^3)}{(x-2) \cdot (-(x+2))} =$
 $= (x+2) \cdot (x-2)^2;$

6) $\frac{t^2-9}{(t+9)^2} \cdot \sqrt{\frac{t^2+18t+81}{(t-3)^2}} = (t < -9)$
 $= \frac{(t-3)(t+3)}{(t+9)^2} \cdot \sqrt{\frac{(t+9)^2}{(t-3)^4}} =$
 $= \frac{(t-3) \cdot (t+3) \cdot |t+9|}{(t+9)^2 \cdot |(t-3)^2|} = \frac{\overset{+}{(t-3)} \cdot (t+3) \cdot \overset{-1}{(-(t+9))}}{(t+9)^2 \cdot (t-3)^2} =$
 $= -\frac{t+3}{(t+9)(t-3)} = \frac{t+3}{(t+9)(3-t)}$