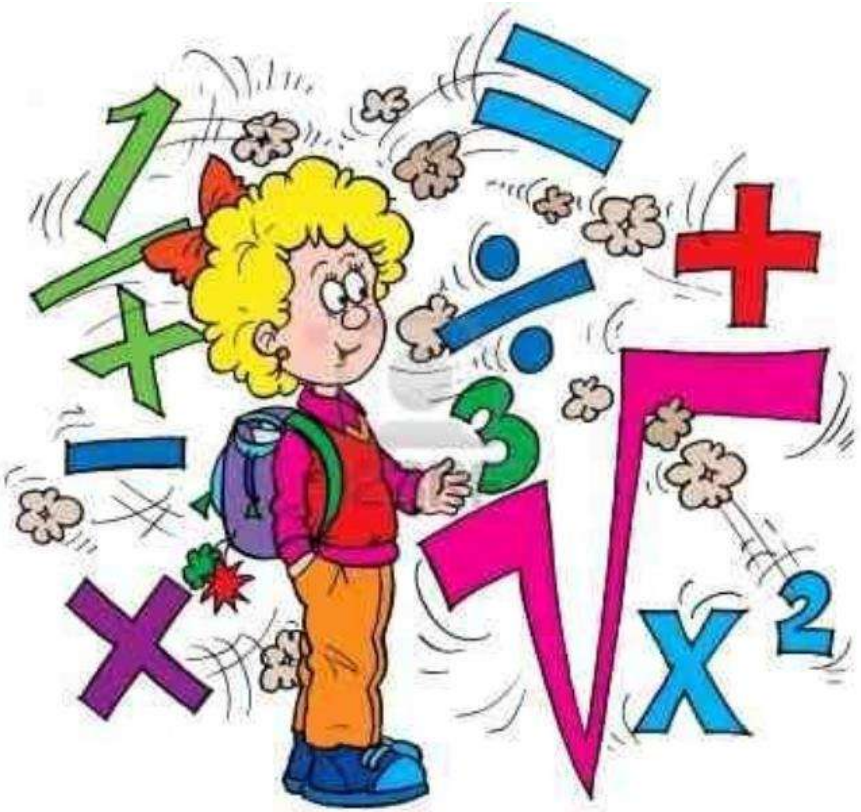
Свойства арифметического квадратного корня



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Если $a \geq 0$; $в \geq 0$, то

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

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Например

$$1)\sqrt{81 \cdot 9} = \sqrt{81} \cdot \sqrt{9} = 9 \cdot 3 = 27$$

$$2)\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = 4$$

$$3)\sqrt{8} = \sqrt{4 \cdot 2} = 2\sqrt{2}$$

$$4)\sqrt{32 \cdot 98} = \sqrt{2 \cdot 16 \cdot 2 \cdot 49} = \sqrt{4 \cdot 16 \cdot 49} =$$

$$= 2 \cdot 4 \cdot 7 = 56$$

Если $a \geq 0$, $в > 0$, то

$$\sqrt{\frac{a}{в}} = \frac{\sqrt{a}}{\sqrt{в}}$$

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Например

$$1) \sqrt{\frac{36}{169}} = \frac{\sqrt{36}}{\sqrt{169}} = \frac{6}{13}$$

$$2) \frac{\sqrt{80}}{\sqrt{5}} = \sqrt{16} = 4$$

$$3)\sqrt{10\frac{9}{16}}=\sqrt{\frac{169}{16}}=\frac{13}{4}$$

$$4)\sqrt{37^2-12^2}=\sqrt{(37-12)(37+12)}=\sqrt{25\cdot 49}=$$

$$=5\cdot 7=35$$

Если $a \geq 0$; $n \in N$, то $\sqrt{a^2} = |a| = \begin{cases} -a, если\ a < 0 \\ a, если\ a \geq 0 \end{cases}$

$$1) \sqrt{5^2} = |5| = 5$$

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

$$3) \sqrt{a^{10}} = \sqrt{\left(a^5\right)^2} = |a^5| = \begin{cases} -a^5, если\ a < 0 \\ a^5, если\ a \geq 0 \end{cases}$$

$$4)\sqrt{x^{12}}=\sqrt{\left(x^{6}\right)^{2}}=\left|x^{6}\right|=x^{6}$$

$$5)\sqrt{(-x)^{14}}=\sqrt{x^{14}}=\sqrt{\left(x^{7}\right)^{2}}=\left|x^{7}\right|=$$

$$=\begin{cases}-x^{7}, если\ x<0\\ x^{7}, если\ x\geq 0\end{cases}$$

$$6)\sqrt{(-y)^{8}}=\sqrt{y^{8}}=\sqrt{\left(y^{4}\right)^{2}}=\left|y^{4}\right|=y^{4}$$

$$7)\sqrt{7056} = \sqrt{2^4 \cdot 3^2 \cdot 7^2} = 2^2 \cdot 3 \cdot 7 = 84$$

7056	2
3528	2
1764	2
882	2
441	3
147	3
49	7
7	7
1	

$$8)\sqrt{\left(\sqrt{7}-12\right)^2}+\sqrt{7}=\left|\sqrt{7}-12\right|+\sqrt{7}=$$

$$=12-\sqrt{7}+\sqrt{7}=12$$