Section 10.1 Radical Expressions and Functions

The square of 5 is 25 because $5^2 = 25$

The square of -5 is 25 because $(-5)^2 = 25$

5 and -5 are square roots of 25

$$\sqrt{25} = 5$$

$$-\sqrt{25} = -5$$

In general b is a square root of a if $b^2 = a$

$$\sqrt{100} = 10$$

($\sqrt{\ }$: radical sign; 100: radicand)

$\sqrt{a}$ is asking for the positive square root of a.

ex: $\sqrt{64} = 8$

$-\sqrt{a}$ is asking for the negative square root of a.

ex: $-\sqrt{64} = -8$

$$\sqrt{0} = 0$$

The square root of a negative number is not a real number.

ex: $\sqrt{64} = 8$

$$-\sqrt{1} = -1$$

$$\sqrt{\frac{1}{16}} = \frac{\sqrt{1}}{\sqrt{16}} = \frac{1}{4}$$

$$\sqrt{0.09} = \sqrt{\frac{9}{100}} = \frac{3}{10}$$

In general

$$\sqrt{N^2} = N$$

ex: $\sqrt{25a^2} = 5a$

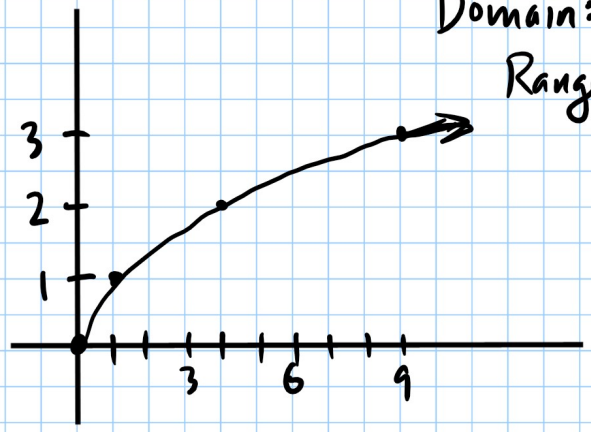
$\sqrt{b^{14}} = \sqrt{(b^7)^2} = b^7$

$\sqrt{100n^8} = 10n^4$

Square Root functions

Graph $f(x) = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3



Domain: $[0, \infty)$

Range: $[0, \infty)$

index → $\sqrt[3]{a} = b$ if $b^3 = a$

b is the cube root of a

When there is no index $\sqrt{\ }$, it's a square root.

n	n^2	n^3	n^4	n^5
1	1	1	1	1
2	4	8	16	32
3	9	27	81	243
4	16	64	256	1024
5	25	125	625	3125
6	36	216	1296	
7	49	343		
8	64	512		
9	81	729		
10	100	1000		
11	121			
12	144			
13	169			

$\sqrt[4]{625} = 5$

$\sqrt[n]{a} = b$ if $b^n = a$

$\sqrt[n]{w^n} = w$

$\sqrt[4]{\frac{1}{81}} = \frac{\sqrt[4]{1}}{\sqrt[4]{81}} = \frac{1}{3}$

$\sqrt[6]{x^6} = x$

$\sqrt[5]{32x^{10}} = \sqrt[5]{32(x^2)^5} = 2x^2$

$\sqrt[4]{625x^{12}} = \sqrt[4]{625(x^3)^4} = 5x^3$

$\sqrt[6]{-64}$ is not a real number

$\sqrt[3]{-27} = -3$ You can odd root a negative