

$$6^2 = 36 \text{ and } (-6)^2 = 36$$

What are the square roots of 36? ± 6

What are the square roots of 81? ± 9

Why are there no real square roots of -36?
No Real number squared is neg.

How many square roots does any positive number have? $\text{two} \rightarrow \pm$

$$3^4 = 81$$

$$(-3)^4 = 81$$

What are the fourth roots of 81? ± 3

What are the fourth roots of 2401? ± 7

Are there any real fourth roots of -256?

No, no real # raised to the 4th power is neg.

How many fourth roots does any positive number have? $2 \rightarrow \pm$

$$5^3 = +125 \quad (-5)^3 = -125$$

How many cube roots does 125 have? ONE

Find the cube root of -125 $\sqrt[3]{-125} = -5$

Find the cube root of -512 $\sqrt[3]{-512} = -8$

How many cube roots does any number have? 1

The cube root of any number has what sign? The same sign as radicand

The number of REAL nth roots of a radicand.

Radicand is	Index is even	Index is odd	$\sqrt[n]{\text{Radicand}}$
Positive	$2 \rightarrow \pm$	1	
Zero	1	1	
Negative	0	1	

There are 2 even roots of every positive number.

$-\sqrt{\quad}$ asks for the Negative Root

$\pm\sqrt{\quad}$ asks for the Pos & Neg Roots


$\sqrt{\quad}$ asks for the Positive Root

What numbers could you square and get 81? ± 9

What are the square roots of 49? ± 7

Solve. $x^2 = 36$ ± 6

Simplify. $\sqrt{441}$ 21

 No symbol in front of the radical means the Positive Root.

Solve. $x^2 = 25$

This is asking you to find all the numbers you could square and get 25.
Find ALL the square roots of 25.

$$x = \pm 5$$

Simplify: $\sqrt{25} = 5$

in this situation $\sqrt{\quad}$ indicates the Principal Root

When there are two roots the Principal Root is the positive root.

Simplify each.

1. $-\sqrt{49} = -7$

2. $\pm\sqrt{36} = \pm 6$

3. $\sqrt{81} = 9$

$\sqrt[3]{-64} = -4$

$\sqrt[3]{125} = +5$

The answer to an odd root has the Same sign as the radicand.

Why is there no principal root of an odd radical?

By definition the Principal Root is the positive root when there are two roots but an odd radical gives only one answer.

What "kind" of number will come from each?

1. x^{12} pos

A real number raised to an even power is ALWAYS POSITIVE.

2. x^{15} pos or neg

3. x^8 pos

A real number raised to an odd power can either be negative or positive.

4. x^7 pos or neg

The answer will have the same sign as the base.

What "kind" of answer will come from each radical?

1. $\sqrt[4]{}$ pos

The answer from an even radical must be POSITIVE. "Principal Root"

2. $\sqrt[5]{}$ pos or neg

Unless there is a - or \pm in front of the radical

3. $\sqrt[9]{}$ pos or neg

The answer from an odd radical can be anything.

4. $\sqrt[8]{}$ pos

Answer will have the same sign as the radicand.