

1-3 Radicals

Definition
nth root

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

- if $n \geq 2$ and even then a and b must be greater than or equal to 0.
- if $n \geq 3$ and odd, then a and b can be any real number.

In $\sqrt[n]{b}$:

The symbol $\sqrt{\quad}$ is called the radical

n is called the index

b is called the radicand

if there is no index, it is 2

on test!

Feb 15-7:11 AM

Evaluate

**what # multiplies by itself 4 times to get 16*

$\sqrt{9}$	$\sqrt{49}$	$\sqrt[4]{16}$
3	7	2
$\sqrt[3]{64}$	$\sqrt[3]{-8}$	$\sqrt[4]{81}$
4	-2	3

Feb 15-7:29 AM

You try

$\sqrt{121}$	$\sqrt[3]{125}$
$\sqrt[3]{-216}$	$\sqrt[5]{32}$

Feb 15-7:35 AM

~~Simplifying~~
If $n \geq 2$ is a positive integer and a is a real number, then

~~$\sqrt[n]{a^n} = a$ if $n \geq 3$ is odd~~

~~$\sqrt[n]{a^n} = |a|$ if $n \geq 2$ is even~~

Feb 15-7:38 AM

Reduce

$\sqrt{x^2} = x$	$\sqrt[5]{x^5} = x$
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** \sqrt{x} and x^2 are opposites so they cancel out.*

Feb 15-8:59 AM

You try

$\sqrt[3]{x^3} = x$	$\sqrt[6]{z^6}$
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** $\sqrt[4]{x^3}$ ← cannot cancel!*

Feb 15-7:43 AM

Simplify *with calc = 4.2... No decimals!*

$\sqrt{18}$ $\sqrt{3^2} = 3$ so $3\sqrt{2}$

$\sqrt{40}$ $\sqrt{2^2} = 2$ so $2\sqrt{5}$

Feb 23-6:47 AM

Simplify (remember $\sqrt{x^2} = |x|$)

$2 \cdot 5 \sqrt{24}$ $10\sqrt{3}$

$\sqrt{128x^2}$ $2 \times \sqrt{2}$ so $8\sqrt{2}$

$\sqrt{20}$ *not 4 of same* $2\sqrt{5}$

Feb 23-6:48 AM

You try

$\sqrt{48}$ $2^2 \sqrt{3}$ $4\sqrt{3}$

$\sqrt{200a^2}$ $2 \cdot 5a\sqrt{2}$ $10a\sqrt{2}$

$4\sqrt{40}$

Feb 23-6:49 AM

Simplify

$\sqrt{12p^2q}$ $2p\sqrt{3q}$

Aug 10-11:28 AM

Remember that

$\sqrt[n]{a^n} = a$ if $n \geq 3$ is odd

$\sqrt[n]{a^n} = |a|$ if $n \geq 2$ is even

For example

$\sqrt{x^2} = |x|$ $\sqrt[3]{x^3} = x$ $\sqrt[4]{x^4} = |x|$ and so on

But to make our life easier some instructions will say "Assume all variables are greater than or equal to zero." In which case:

$\sqrt{x^2} = x$ $\sqrt[3]{x^3} = x$ $\sqrt[4]{x^4} = x$ and so on

SO READ YOUR INSTRUCTIONS!!!

Feb 23-6:54 AM

Reduce Assuming all variables are greater than or equal to zero.

(You can either do these using rational exponents or not.)

$\sqrt{x^6}$ x^3

$\sqrt[3]{x^{12}}$

Feb 23-7:03 AM

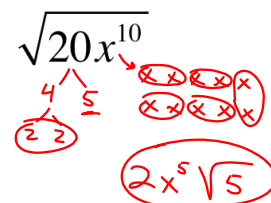
You try

$$\sqrt{48} \qquad 4\sqrt[3]{54}$$

$$\sqrt{200a^2} \qquad \sqrt[4]{40}$$

Feb 23-6:49 AM

Reduce Assuming all variables are greater then or equal to zero.

$$\sqrt{20x^{10}}$$


Feb 23-7:07 AM

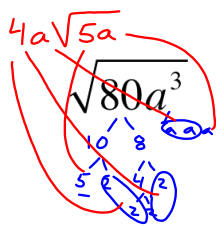
You try

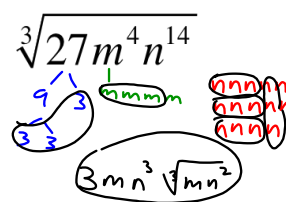
$$\sqrt{75a^6}$$

Feb 23-7:08 AM

Simplify Assuming all variables are greater then or equal to zero.

$$4a\sqrt{5a}$$

$$\sqrt{80a^3}$$


$$\sqrt[3]{27m^4n^{14}}$$


Feb 23-7:08 AM

You Try

$$\sqrt[3]{128x^6y^{10}} \qquad \sqrt[4]{16a^5b^{11}}$$

Feb 23-7:09 AM

Blank space for student work.

Aug 9-11:37 AM