

Day 4 - Simplifying Radicals - Notes

'4' is the coefficient. Technically, 4 is being multiplied by $\sqrt{10}$.

radical symbol

'10' is the radicand. The radicand is the number "in the house".

A radical is any number with a radical symbol ($\sqrt{\quad}$).

A radical expression is an expression (coefficients and/or variables) with radical.

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radical symbol

radicand

Square Root Table

Complete the table below.

Square each of the following numbers.

Perfect Squares

Take the square root of each of your perfect squares.

Square Roots

1^2	2^2	3^2	4^2	5^2	6^2	7^2	8^2	9^2	10^2	x^2
1	4	9	16	25	36	49	64	81	100	x^2
$\sqrt{1}$	$\sqrt{4}$	$\sqrt{9}$	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{36}$	$\sqrt{49}$	$\sqrt{64}$	$\sqrt{81}$	$\sqrt{100}$	$\sqrt{x^2}$
1	2	3	4	5	6	7	8	9	10	x

Perfect Squares are the product of a number multiplied by itself ($4 \cdot 4 = 16$; 16 is the perfect square).

Think about the process we just performed: **Number \rightarrow Squared It \rightarrow Took Square Root \rightarrow Same Number**

A root and an exponent are **inverses** of each other (they undo each other). Therefore, square roots and squaring a number are **inverses** or they undo each other, just like adding and subtracting undo each other.

When are Radical Expressions in Simplest Form?

A radical expression is in **simplest form** if:

- No perfect square factors other than 1 are in the radicand (ex. $\sqrt{20} = \sqrt{4 \cdot 5}$)

Simplifying Radicals

Guided Example: Simplify $\sqrt{108}$.

<p>Step 1: Find the prime factorization of the number inside the radical.</p>	
<p>Step 2: Determine the index of the radical. Since we are only talking about square roots, the index will be 2, which means we will circle all of our two of a kind.</p>	
<p>Step 3: Move each circled pair of numbers or variables from inside the radical to outside the radical. List your circled pair as just one factor outside the radical.</p>	
<p>Step 4: Simplify the expressions both inside and outside the radical by multiplying.</p>	

Practice:

a. $\sqrt{16}$
4

b. $\sqrt{48}$

c. $\sqrt{28}$

d. $\sqrt{14}$

e. $3\sqrt{96}$

f. $4\sqrt{20}$

g. $6\sqrt{120}$

h. $2\sqrt{36}$ ← perfect square
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