Algebra 2C Notes Name: _____

6-1 Roots and Radical Expressions

Date: _____ Hr: _____

Objectives:

- To find nth roots

Common Core Content Standard:

A.SSE.2 Use the structure of an expression to identify ways to rewrite it.

Corresponding to every power, there is a _____ . For example, just as there are squares (second powers), there are square roots. Just as there are cubes (third powers), there are cube roots and so on.

$5^2 = 25$ 5 is a square root of 25.
$5^3 = 125$ 5 is a cube root of 125.
$5^4 = 625$ 5 is a fourth root of 625.
$5^5 = 3125$ 5 is a fifth root of 3125.

Take note

Key Concept The *n*th Root

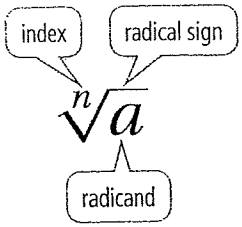
$a^n = b$, with a and b real numbers and n a positive integer, then a is an nth root of b.

If n is odd... there is one real nth root of b, denoted in radical form as $\sqrt[n]{b}$.

If n is even...
- and b is positive, there are two real nth roots of b. The positive root is the principal root (or principal nth root) and its symbol is $\sqrt[n]{b}$. The negative root is its opposite, or $-\sqrt[n]{b}$.
- and b is negative, there are no real nth roots of b.

The only nth root of 0 is 0.

You use a radical sign to indicate a root. The number under the radical sign is the _____. The _____ gives the degree of the root.



Example 1: Finding all Real Roots

What are all the real square roots of -0.81, $\frac{25}{49}$, and 121?

Example 2: Finding Roots

What is each real number root of $\sqrt{0.36}$, $\sqrt[3]{-1}$, *and* $\sqrt{(-17)^2}$?

take note

Property *n*th Roots of *n*th Powers

For any real number a, $\sqrt[n]{a^n} = \begin{cases} a \text{ if } n \text{ is odd} \\ |a| \text{ if } n \text{ is even} \end{cases}$

Example 3: Simplifying Radical Expressions

What is the simplified form of each radical?

a.) $\sqrt{25a^4}$

b.) $\sqrt[4]{p^{12}q^4}$

Example 4:

The speed s in meters per second of a car leaving a skid mark d meters long after the brakes are applied is given by the formula $s = \sqrt{15d}$. If you measure a skid mark and it is 180 meters long, how fast was the car going before it braked?