Algebra II Section 5-5 Notes Name ____________________________

Roots of Real Numbers

Target Goals:

1. Simplify radicals
2. Use a calculator to approximate radicals

I) SQUARES VS. SQUARE ROOTS

a. Squares

$5^2 =$

$(-5)^2 =$

$-5^2 =$

b. Square Roots

$\sqrt{25} =$

$-\sqrt{25} =$

$\pm\sqrt{25} =$

b. Notation

$$\sqrt[2]{34}$$

The ___________________________________ is the positive value of a square root.

- If a radical sign is already in the problem, our answer is always the principal root $\sqrt{81} = 9$
- If there is an equation that has to be solved , this is something we can factor and take into account both positive and negative answers

$$x^2 - 81 = 0$$
$$(x-9)(x+9) = 0$$
$$zero\_product\_property$$
$$(x-9) = 0$$
$$(x+9) = 0$$
$$x = 9, -9$$

If the radical sign is NOT in the problem to start, and YOU put it there, you must include a ______ symbol in your final answer.

c. Examples

1) $\sqrt{36} =$

2) $\sqrt{64} =$

3) $\sqrt{9/100} =$

4) $x^2 = 36$

5) $a^2 = \frac{4}{9}$

6) $w^2 = 625$

II) ROOTS WITH AN INDEX OTHER THAN TWO

a. Cubes

2^3=

$\sqrt[3]{8} = ?$ (x^3=8)

-2^3=

$\sqrt[3]{1} =$

$(-2)^3$=

b. Examples with indexes other than 2 and 3.

$\sqrt[4]{16} =$

$\sqrt[6]{64} =$

$\sqrt[3]{\frac{1}{125}} =$

$\sqrt[5]{32} =$

$-\sqrt[5]{32} =$

c. Calculator Practice!

i. Cube Root
1. MATH
2. 4: $\sqrt[3]{(}$
3. Enter the radicand

ii. n^{th} Root
1. Enter the index
2. MATH
3. 5: $\sqrt[x]{(}$
4. Enter the radicand

iii. Try a couple!

$\sqrt[3]{343} =$

$\sqrt[5]{32768} =$

$\sqrt[4]{28561} =$

III) RADICANDS CONTAINING VARIABLES

a. The trick…

i. $\sqrt{(-3)^2} =$

ii. $\sqrt{3^2} =$

iii. Whether 3 is _______ or ________, then the answer is still positive 3

b. The Rule:

Take a look at $\sqrt[2]{y^2} =$

c. Examples

$\sqrt{x^8} =$ $\sqrt{9x^2} =$ $\sqrt{x^2} =$

$\sqrt[3]{27y^6} =$ $\sqrt{16x^{16}} =$

IV) LET'S TRY SOME MORE COMPLEX EXAMPLES

a) $-\sqrt{121a^6b^2}$ b) $\pm\sqrt{169x^4}$ c) $-\sqrt{(8x-3)^2}$

d) $\sqrt{x^2-8x+16}$ e) $\sqrt[3]{-m^3n^3}$ f) $\sqrt[5]{32x^5y^{10}}$

g) $\sqrt[4]{(an)^4}$ h) $\sqrt[6]{(3-y^2)^{18}}$