

Algebra II Section 5-5 Notes
Roots of Real Numbers

Name _____

Target Goals:

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

I) SQUARES VS. SQUARE ROOTS

a. Squares

$$5^2 =$$

$$(-5)^2 =$$

$$-5^2 =$$

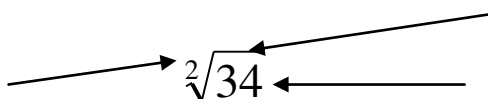
b. Square Roots

$$\sqrt{25} =$$

$$-\sqrt{25} =$$

$$\pm \sqrt{25} =$$

b. Notation



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

$$1) \sqrt{36} =$$

$$2) \sqrt{64} =$$

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

$$4) x^2 = 36$$

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

$$6) w^2 = 625$$

II) ROOTS WITH AN INDEX OTHER THAN TWO

a. Cubes

$$2^3 =$$

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

$$-2^3 =$$

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

$$(-2)^3 =$$

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. nth 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) $\sqrt[6]{(3-y^2)^{18}}$