TOPIC: RADICAL EXPRESSIONS

Square Roots

- The _____ of squaring a number is taking the square root.
  - Positive real numbers always have TWO roots: A _____ ("principal") and a _____ root.

Square Roots

$\sqrt{9}$ = ___

$\sqrt{9}$ = ___

$\sqrt{-9}$ = _____

Negative #s _____ be square rooted!

Radical Symbol
- $\sqrt{\ }$ means positive root;
- $-\sqrt{\ }$ means negative root;
- $\pm\sqrt{\ }$ means both

Radicand: Term inside the radical

Warning!

$\sqrt{9} \neq \pm 3$

MEMORY TOOL

Negatives ____*side* $\sqrt{\ }$ → __*kay*

Negatives ____*side* $\sqrt{\ }$ → __*maginary*

EXAMPLE: Evaluate the radicals.

(A) $\sqrt{36}$

(B) $-\sqrt{36}$

(C) $\sqrt{-36}$

PRACTICE: Evaluate the radical.

$$-\sqrt{\frac{1}{4}}$$

PRACTICE: Evaluate the radical.

$$\sqrt{(-5)^2}$$

TOPIC: RADICAL EXPRESSIONS

Even vs. Odd Roots

- The reverse of raising a number to the n[th] power is taking the _____.
  - n is the **index**, written at top-left of $\sqrt{\ }$ (Square Roots → n = 2, not written)

n^{th} Roots
$(a)^n = b \leftrightarrow \sqrt[n]{b} = a$

Even Index (n = 2,4,6…)		Odd Index (n = 3,5,7…)	
	(*Square Root*)		(*Cube Root*)
$(2)^2$ = ___	$\pm\sqrt{4}$ = _____	$(2)^3$ = ___	$\sqrt[3]{\ }$ = _____
$(-2)^2$ = ___	$\sqrt{-4}$ = _____	$(-2)^3$ = ___	$\sqrt[3]{\ }$ = _____
• **[2 | 1]** root(s): 1 positive, 1 negative		• **[2 | 1]** root(s) → Roots always _____ sign as radicand	
• Neg inside $\sqrt{\ }$ → Answer is **[IMAGINARY | NEGATIVE]**		• Neg inside $\sqrt{\ }$ → Answer is **[IMAGINARY | NEGATIVE]**	

EXAMPLE: Evaluate the following n[th] roots if possible or indicate the answer is imaginary.

(A) $\sqrt[4]{81}$ (B) $\sqrt[5]{-32}$ (C) $\sqrt[4]{-16}$ (D) $\sqrt[7]{(-5)^7}$

- If a term in $\sqrt{\ }$ has an exponent = the index, they cancel out, leaving just the radicand.

PERFECT POWERS	
Squares	**Cubes**
$2^2 = 4$	$2^3 = 8$
$3^2 = 9$	$3^3 = 27$
$4^2 = 16$	$4^3 = 64$
$5^2 = 25$	$5^3 = 125$
$6^2 = 36$	**Other**
$7^2 = 49$	$2^4 = 16$
$8^2 = 64$	$2^5 = 32$
$9^2 = 81$	$3^4 = 81$
$10^2 = 100$	