

TOPIC: THE IMAGINARY UNIT

Square Roots of Negative Numbers

- Recall: Square roots of positive numbers are **real**, but square roots of negative numbers are **not real**.

$$\sqrt{4}$$

$$\sqrt{-1}$$

- We came up with the letter ***i*** to express this:

$$i = \underline{\hspace{2cm}}$$

The Imaginary Unit

- Factor** to separate the **negative** in the square root.

EXAMPLE: Simplify the given square root.

$$\sqrt{-4}$$

$$\sqrt{-b} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

**b* is a positive, real number.

EXAMPLE: Simplify the given square root.

(A) $\sqrt{-17}$

(B) $\sqrt{-32}$

$\underline{\hspace{1cm}} \# \underline{\hspace{1cm}} \underline{\hspace{1cm}}$

Note: Because all of these solutions include the imaginary unit, they are called ***imaginary numbers***.

PRACTICE: Simplify the given square root. $\sqrt{-75}$