9.1 Real Numbers and Evaluating Radicals

Integers –

Rational Numbers –

Irrational Numbers –

Definition:

- The **principal square root** of a nonnegative number *a,* written as $\sqrt[2]{a}$ = b or $\sqrt{a}$= b is the positive number ***b*** such that $b^2 = a$.
  - Ex. $\sqrt{25} = 5 \; and \; 5^2 = 25$
  - The **square root of a negative number** is not a real number.
    $\sqrt{-25} \neq 5 \times 5 \; or \; -5 \times -5$

Example

1) $\sqrt{169}$ 2) $-\sqrt{121}$ 3) $\sqrt{-4}$ 4) $\sqrt{\frac{1}{4}}$

*For **higher roots**: still use the radical sign but must include an index to show which root is wanted

1. $\sqrt[3]{27}$ = _____ can $\sqrt[3]{-27}$ be found?
2. When is it possible to find the n^{th} root of a negative number?

Example

1) $\sqrt[3]{216}$ 2) $\sqrt[3]{-125}$ 3) $-\sqrt[3]{-64}$

- What happens when we try to take the square root of 7?
  - Since 7 is not a perfect square we say that it is an _____ **number** and we approximate the square root.
    - Use the calculator to approximate to 2 decimal places

Do the following on your calculator and round to 3 decimal places

3. $\sqrt{75}$ 4. $-\sqrt{18}$ 5. $\sqrt{32}$ 6. $\sqrt[3]{36}$ 7. $\sqrt[4]{64}$

8. $3-\sqrt{8}$ 9. $\dfrac{2+\sqrt{5}}{4}$ 10. $\dfrac{-6+\sqrt{3}}{7}$

Use the definition of square root to find the square of each radical expression.

11. $\sqrt{15}$ 12. $\sqrt{7}$ 13. $-\sqrt{23}$

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