

Lesson 1.1.2 Rational and Irrational Numbers and Their Properties

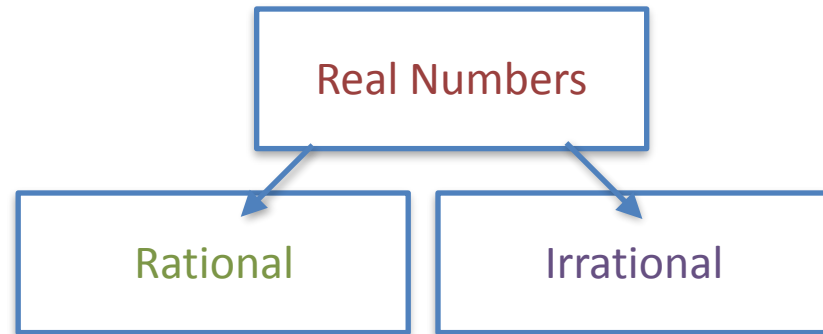


By the end of this lesson, I will be able to answer the following questions...

1. How can I solve a basic exponential equation?
2. How can I determine if a number is rational or irrational?
3. What is CLOSURE and how does it apply to rational and irrational numbers?

Vocabulary

- **Real Numbers:** The set of all rational and irrational numbers.
 - **Rational Number:** A number that can be expressed as fraction. When written as decimals, the *DO* terminate or repeat.
 - **Irrational Number:** A number that cannot be expressed as a fraction. When written as decimals, the *DO NOT* terminate or repeat.



Categorize the following.....

$$\sqrt{81}$$

$$\sqrt{7}$$

$$\frac{2}{3}$$

$$.23232323.....$$

$$\pi$$

$$3^{\frac{1}{3}}$$

Prerequisite Skills with Practice

Rewrite the following without exponents.

$$3^{-2} =$$

$$\left(\frac{1}{2}\right)^{-4} =$$

$$\frac{2^{-3}}{3} =$$

$$\frac{2}{5^{-2}} =$$

$$-4^2 =$$

$$(-4)^2 =$$

Example one

*Simplify the numeric
and algebraic expressions*

$$\left(3^{\frac{1}{3}}\right)\left(3^{\frac{5}{3}}\right) \quad a^{\frac{6}{5}} \cdot a^{\frac{3}{2}}$$

Example two

*Simplify the numeric
and algebraic expressions*

$$\frac{125^3}{5} \quad \frac{a^{\frac{7}{9}}}{a^{\frac{2}{3}}}$$

Example three

Solve the equation. Then categorize the solution as either Rational or Irrational. Think About if you need a calculator or not.

$$x^{\frac{2}{5}} = 3$$

Example four

Solve the equation. Then categorize the solution as either Rational or Irrational. Think About if you need a calculator or not.

$$\sqrt[4]{x^3} = 125$$

THE END



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