



8.1 Definitions and Roots

■ Need To Know

- How to find the root of a number
- Categorizing roots
- How to find the root of an expression
- How to solve application problems involving roots



Idea of Square Roots

In mathematics, once we learn an operation, we also learn the reverse of that operation.

For real numbers x and y ,

If $y = x^2$, then $x = \underline{\hspace{2cm}}$

Don't Forget
Radicand
Radical Sign
Radical

Definitions and Roots

Definition – If x is any positive real number, then

\sqrt{x} is the _____ square root of x and
 $-\sqrt{x}$ is the _____ square root of x .

Examples:

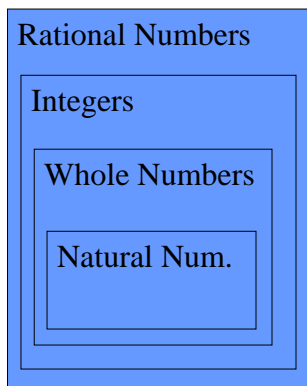
Name the two square roots of 81.

Find the root of $\sqrt{25}$

Simplify $-\sqrt{100}$

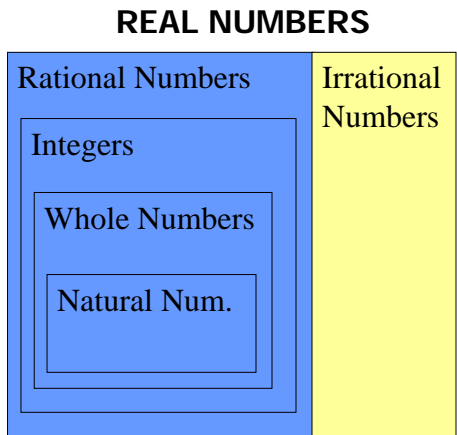
Evaluate $\sqrt{121}$

Recall Number Sets



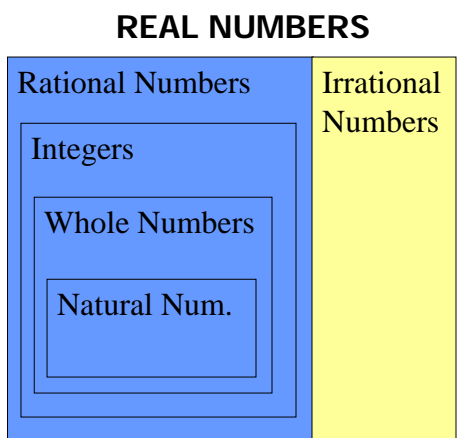
- Rational Numbers are the numbers of the form a/b where b is not zero.
- Rational Numbers is the set of all fractions

Recall Number Sets



- Irrational Numbers are the numbers that can not be written as fractions
- Real Numbers are the collection of all Rational and Irrational Numbers.

Categorize Roots



- $\sqrt{21}$
- $\sqrt{196}$
- $\sqrt{40}$
- $\sqrt{-9}$



Square Roots & Absolute Value

Consider $\sqrt{(-7)^2} = \sqrt{49} = 7$ and $\sqrt{(7)^2} = \sqrt{49} = 7$

Both come out positive.

Recall: $|-7| = 7$ and $|7| = 7$.

For all real numbers A, _____

Examples:

$$\sqrt{y^2}$$

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

$$\sqrt{\frac{100z^6}{36m^{14}}}$$



Application

The speed of sound in feet per second, V , traveling through air with a temperature of t is given by the formula below. Find the speed of sound when the temperature is 5° C.

$$V = \frac{1087\sqrt{273+t}}{16.52}$$



8.1 Conclusion

- The square root is the number that “undoes” the square.
- Square roots can be positive or negative.
- The square root of zero is zero.
- The square root of a negative number is not a Real Number
- A square root results in a Rational, Irrational or Non-Real Number