

Understanding of Numbers

A Foundational and Fun Exploration

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Types of Numbers

- **Natural Numbers** ($\mathbb{N}$): $1, 2, 3, \dots$
- **Whole Numbers** ($\mathbb{W}$): $0, 1, 2, 3, \dots$
- **Integers** ($\mathbb{Z}$): $\dots, -3, -2, -1, 0, 1, 2, 3, \dots$
- **Rational Numbers** ($\mathbb{Q}$): Can be written as $\frac{a}{b}$ where $b \neq 0$
- **Irrational Numbers**: Cannot be written as $\frac{a}{b}$ (e.g., $\sqrt{2}, \pi$)
- **Real Numbers** ($\mathbb{R}$): All of the above combined!

Real Numbers $\mathbb{R}$

Rational Numbers $\mathbb{Q}$

Integers $\mathbb{Z}$

Whole Numbers $\mathbb{W}$

Natural Numbers $\mathbb{N}$

Irrational Numbers

Examples: $\sqrt{2}$, π , e

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Curious Check!

Try this:

Check $\sqrt{2}$ in your calculator. What do you notice?

- Yes! It is approximately 1.414...
- Can you write this as a simple fraction? **No!**
- The decimal goes on and on *without repeating*.

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Try $\sqrt{3}$ and $\sqrt{7}$

What do you observe? Just like $\sqrt{2}$, their decimal parts neither terminate nor repeat!

Summary - Fun Fact!

- The **square root of all prime numbers** is irrational.
- This means $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7}, \sqrt{11}, \dots$ are all irrational.
- They cannot be written as fractions.
- Their decimal parts go on forever.

Cheerssss! Keep exploring numbers!