Irrational numbers

What are irrational numbers?

Irrational means not rational. So, to understand irrational numbers, you need to first understand rational numbers.

A **rational number** is a number that can be made by dividing two integers. You can write any rational number as a fraction.

−7 is a rational number because it can be written as $\frac{-7}{1}$.

3.25 is a rational number because it can be written as $\frac{13}{4}$.

$1.\overline{54}$ is a rational number because it can be written as $\frac{17}{11}$.

Irrational numbers are numbers that are not rational. So, an irrational number is any number that cannot be made by dividing two integers. Irrational numbers cannot be written as fractions. Irrational numbers written as decimals never terminate and never repeat.

π, the number pi, is an irrational number because it cannot be written as a fraction and it does not terminate or repeat when written as a decimal. π is 3.1415926535...

e, Euler's number, is an irrational number because it cannot be written as a fraction and it does not terminate or repeat when written as a decimal. *e* is 2.7182818284...

Square roots

Many square roots are irrational.

$\sqrt{2}$ is an irrational number. $\sqrt{2}$ is 1.4142135623...

$\sqrt{40}$ is an irrational number. $\sqrt{40}$ is 6.3245553203...

But, be careful! Not all square roots are irrational. Some square roots are rational.

$\sqrt{25}$ is a rational number. $\sqrt{25}$ is 5, or $\frac{5}{1}$.

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Is 51.636 a rational number?

yes | no

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