

Irrational Numbers

Irrational Number

A number that -- CAN NOT BE WRITTEN -- as a fraction (ratio) with an integer on top and an integer on the bottom is an irrational number.

Examples of irrational numbers:

- A square root of a number \sqrt{x} , is irrational if the number x IS NOT a perfect square. $\sqrt{8}$, $\sqrt{10}$, $\sqrt{24}$, and $\sqrt{40}$ are all irrational numbers since 8, 10, 24, and 40 are not perfect squares.
- A decimal that never ends and never repeats a group of the same digits is called a non-terminating, non-repeating decimal. Decimals of this type are irrational because they can't be written as a ratio of two integers.

Examples of non-repeating non-terminating decimals are:

- .405375920721... there is no group of digits that repeats.
- .10100100010000... even though you can see a pattern (just add one more 0 each time) there is no group of digits that repeats.
- 27.23233233323333... even though you can see a pattern (just add one more 3 each time) there is no group of digits that repeats.
- One irrational number you are probably familiar with is π . If you are familiar with π (3.14159...) you know that it never ends and there is no group of digits that repeats. Like all non-repeating non-terminating decimals π can be written out to thousands of decimal places and yet it still keeps on going. That is why the symbol π is used to represent it instead of the approximations 3.14 or $22/7$ when perfect accuracy is required.

Integer

A number that does not have a fraction or decimal part. Integers are commonly shown as: $\{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$.