Numbers, Irrational Encyclopedia Article

Numbers, Irrational

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Numbers, Irrational

The set of irrational numbers is the set of real numbers that cannot be expressed as the ratio, or quotient, of two **integers**. Thus, an irrational number cannot be written in the form , where *a* and *b* are integers and $b \neq 0$. A real number is irrational if its decimal representation is nonterminating and nonrepeating. Irrational numbers contrast with rational numbers, which *can* be expressed as the ratio of two integers. Every rational number, when changed to a decimal number, will be either a repeating or a terminating decimal number.

Irrational numbers are found everywhere. The square roots of natural numbers that are not perfect squares, such as , and are irrational numbers. In any circle, the ratio of the distance around the circle to the distance across the circle is π, another irrational number. Finally, another instance of an irrational number is *e*, the base for natural logarithms, which is used in solving problems such as the population growth of bacteria and the rate of decay of radioactive substances such as uranium. The value of $e = 2.7182818284\ldots$. If you substitute large numbers for the valueof *n* in the formula , you can approximate the value of the irrational number, *e*.

See Also

Integers; Numbers, Rational; Numbers, Real.

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