Concept Summary Real Numbers

Real Numbers

Rational Numbers	Integers	Whole Numbers	Natural Numbers	Irrational Numbers
$\frac{-2}{3}$	-3	0	$\sqrt{25}$	$\sqrt{10}$ $-\sqrt{123}$
$0.\overline{3}$	$-\frac{10}{5}$		$\frac{4}{2}$ 7	$0.1010010001...$
$\sqrt{0.25}$	$-\sqrt{16}$			π

A **rational number** is any number that you can write in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$. A rational number in decimal form is either a terminating decimal such as 5.45 or a repeating decimal such as $0.41666\ldots$, which you can write as $0.41\overline{6}$. Each graph below shows a subset of the rational numbers on a number line.

Natural numbers $\{1, 2, 3, \ldots\}$

Whole numbers $\{0, 1, 2, 3, \ldots\}$

Integers $\{\ldots -2, -1, 0, 1, 2, 3, \ldots\}$

An **irrational number** cannot be represented as the quotient of two integers. In decimal form, irrational numbers do not terminate or repeat. Here are some examples.

$$0.1010010001\ldots \qquad \pi = 3.14159265\ldots$$

Some square roots are rational numbers and some are irrational numbers. If a whole number is not a perfect square, its square root is irrational.

Rational $\sqrt{4} = 2$ $\sqrt{25} = 5$

Irrational $\sqrt{3} = 1.73205080\ldots$ $\sqrt{10} = 3.16227766\ldots$

Rational numbers and irrational numbers form the set of **real numbers.**

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