

Real numbers: the union of rational and irrational numbers

Rational numbers: numbers that can be expressed as an integer fraction. That is, a fraction $\frac{j}{k}$ where j and k are integers and $k \neq 0$.

Note that all integers, terminating decimals, and repeating decimals can be expressed this way and are therefore rational numbers.

Examples: $\frac{-1}{23}$, 0.86 , $0.\bar{3}$, $\sqrt{4}$

Integers: the union of the **negative integers** (the opposites of the positive integers), zero, and the positive integers (i.e. the natural numbers); $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

Note that zero is neither positive nor negative.

Whole numbers: the union of zero and the natural numbers; $\{0, 1, 2, 3, \dots\}$

Natural numbers (also known as **counting numbers** and **positive integers**): $\{1, 2, 3, \dots\}$

Irrational numbers: numbers that cannot be expressed as a fraction of two integers; that is, all non-terminating, non-repeating decimals.

Any root that is not perfect will be a non-terminating, non-repeating decimal.

Examples: $\sqrt{2}$, $\sqrt[3]{5}$, π