



# The Number System

Simply put, there are two basic categories of numbers in our number system: Real Numbers and Non-Real Numbers, otherwise known as *Imaginary Numbers*. If you have not yet learned about imaginary numbers, all you need to know at this time is that all numbers are real numbers EXCEPT imaginary numbers. Listed below are the real numbers:

## Real Numbers

### Natural Numbers

begin with the number one and continue infinitely in the positive direction:  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10...

### Whole Numbers

begin with the number zero and continue infinitely in the positive direction. Take note that whole numbers are an extension of natural numbers but include the number zero:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10...

### Integers

are all numbers on the number line from the negative infinity direction and continue infinitely in the positive direction. Integers include all of the preceding numbers (natural numbers and whole numbers ).

...-10, -9, -8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10...

### Rational Numbers

are integers, but in the form of ratios or fractions. A fraction is actually a ratio of two integers. Repeating decimals, terminating decimals, and perfect square roots are considered rational numbers as well, because they can be converted or rewritten as ratios (fractions):

$$\frac{3}{8}, -\frac{5}{6}, 0.66 \text{ or } \frac{2}{3}, 4 \text{ or } \frac{4}{1}, \sqrt{9} = 3\frac{3}{1}, 0.75 = \frac{75}{100} = \frac{3}{4}, 0.142857142857 = \frac{1}{7}$$

## Non-Real Numbers

### Irrational Numbers

are numbers that cannot be written as a ratio or fraction, for example: non-terminating decimals, and non-perfect square roots:

$$0.51962..., -0.02145..., \sqrt{7} = 2.6457, \pi 3.1415333, e = 2.71828...$$