

Rational Numbers- Introduction

What is rational numbers?

The numbers of the form a/b, or a number which can be expressed in the form a/b, where ‘**a’** and ‘**b’** are integers and b ≠ 0, are called rational numbers.

In other words, a rational number is any number that can be expressed as the quotient of two integers with the condition that the divisor is not zero.

**For examples**; each of the numbers 2/3, 5/8, -3/14, -11/-5, 7/-9, 7/-15 and -6/-11 is a rational number.

**Numerator and denominator:** If a/b is a rational number, then the integer a is known as its numerator and the integer b is called the denominator.

Is every rational number a natural number?

Every natural number is a rational number but a rational number need not be a natural number.

We know that, 1 = 1/1, 2 = 2/1, 3 = 3/1 and so on ……. .

In other words, every natural number n can be written as n = n/1, which is the quotient of two integers. Thus, every natural number is a rational number.

Clearly, 3/2, 2/5, 1/7, 15/20, etc. are rational numbers but they are not natural numbers.

Hence, every natural number is a rational number but a rational number need not be a natural number.

Is zero a rational number?

Yes zero is a rational number.

We know that the integer 0 can be written in any one of the following forms.

**For example,** 0/1, 0/-1, 0/2, 0/-2, 0/3, 0/-3, 0/4, 0/-4 and so on …..   
In other words, 0 = 0/b, where ***b*** is any non-zero integer

Thus, 0 can be written as, where a/b = 0, where a = 0 and b is any non-zero integer.

Hence, 0 is a rational number.

Is every rational number an integer?

Every integer is a rational number but a rational number need not be an integer.

We know that 1 = 1/1, 2 = 2/1, 3 = 3/1, 4 = 4/1 and so on ……. .

also, -1 = -1/1, -2 = -2/1, -3 = -3/1, -4 = -4/1 and so on …….. .

In other words, any integer **a** can be written as a = a/1, which is a rational number.

Thus, every integer is a rational number.

Clearly, 3/2,-5/3, etc. are rational numbers but they are not integers.

Hence, every integer is a rational number but a rational number need not be an integer.

Is every rational number a fraction?

Every fraction is a rational number but a rational number need not be a fraction.

Let **a/b** be any fraction. Then, **a** and **b** are natural numbers. Since every natural number is an integer. Therefore, **a** and **b** are integers. Thus, the fraction a/b is the quotient of two integers such that b ≠ 0.

Hence, **a/b** is a rational number.

We know that 2/-3 is a rational number but it is not a fraction because its denominator is not a natural number.

Since every mixed fraction consisting of an integer part and a fractional part can be expressed as an improper fraction, which is quotient of two integers.

Thus, every mixed fraction is also a rational number.

Hence, every fraction is also a rational number.

Equivalent rational numbers

