We all have studied number system since our childhood. So, today we are going to discuss about basic classification of numbers. Let's get started.

Numbers: The basic pillar of Mathematics, the language of the universe. The thing which we learnt in our first mathematics class. The thing we deal with, in our day-to-day life. The thing which is almost everywhere.

Real Numbers: These are the numbers whose squares are positive numbers.

Imaginary Numbers: These are the numbers whose squares are negative numbers. They are represented by iota 'i'. ($i = \sqrt{(-1)}$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$) E.g. If the number 6i is given, it means it's value is $6 \times \sqrt{(-1)} = 6\sqrt{(-1)} = \sqrt{(-36)}$

Rational Numbers: The numbers which can be written in the form p/q where p and q are co-prime integers and q not equal to 0. i.e. In decimal form, they are either terminating or recurring numbers. Let's find out how we can convert a rational number from decimal form to fraction form.

Classification

Numbers can be classified into two groups, i.e. Real and imaginary numbers. Real numbers can be represented on number line. Real numbers can further be classified into two groups, i.e. rational and irrational numbers. Rational numbers can also be classified as terminating and non-terminating. And so on...

E.g. Express 0.82828282…. in the form of a fraction.

Sol: Let x = 0.82828282… _____(1)

As the period contains 2 digits, we multiply by $10^2 = 100$,

100x = 82.82828282…. _____(2)

Now, (2) – (1), we get, 99x = 82 ⇒ x = 82/99.

E.g. Express 0.024024024024024….. in the form of a fraction.

Sol: Let x = 0.024024024024…. ____(1)

As the period is contains 3 digits, we multiply with $10^3 = 1000$

1000x = 24.02404024…. ____(2)

Now, (2) – (1), we get, 999x = 24 ⇒ x = 24/999 = 8/333.

Irrational Numbers: The numbers which cannot be written as p/q. i.e. In decimal form, these numbers are non-terminating and non-recurring numbers. e.g. √2.

Integers: The numbers whose value after decimal is 0.

Decimals: The numbers whose value after decimal is non zero. e.g. 3.456

Negatives: The numbers whose value is less than 0.

Positives: The numbers whose value is more than 0.

Natural Numbers:- The integers more than 0.

Whole Numbers: Whole numbers are basically natural numbers, including 0. These are also called non-negative integers.

Prime Numbers: The number which has exactly two factors (1 and the number itself).

Composite Numbers: The number which has more than two factors. [Note: 1 is neither Prime nor Composite number.]

Prime numbers

As we have discussed earlier, these are the numbers which have exactly two factors. These two factors are 1 and the number itself. From 1 to 50, we have 15 prime factors. From 1 to 100, we have 25 prime factors. And these are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.

Prime numbers have some properties like:

1. No integer can divide them completely other than 1 and the number itself (that's why they have only two factors).
2. Every prime number should be in the form of [4n + 1 or 4n – 1] for less than 5 and [6n + 1 or 6n – 1] for more than or equal to 5. But the reverse of this statement is not true. e.g. 25 can be written as 6(4) + 1 but it is not a prime number.
3. Every integer, greater than 1, can be written as the product of prime numbers.

Since, there is no formula to find out whether a number is prime or not. But for small numbers, we can use this trick. Take the square root of the number (approximately) and check its divisibility by the prime numbers smaller than its square root.

1) E.g. Check whether 97 is a prime number or not. Sol: Square root of 97 will be between 9 and 10. So the prime numbers smaller than 9 are 2, 3, 5 and 7. Since 97 is not divisible by any of these, hence it is a prime number. 2) E.g. Check whether 91 is a prime number or not. Sol: Square root of 91 will be between 9 and 10. So the prime numbers smaller than 9 are 2, 3, 5 and 7. Since 91 is divided by 7 (13 × 7 = 91). 91 is not a prime number.

Let me make this thing very clear that this is the most important topic of the quant section. Not only this one, but the entire Number System. Hope this blog helped you to learn well. Stay tuned for more.