

REAL NUMBERS

S.no	Type of Numbers	Description
1	Natural Numbers	$N = \{1, 2, 3, 4, 5, \dots\}$ It is the counting numbers
2	Whole number	$W = \{0, 1, 2, 3, 4, 5, \dots\}$ It is the counting numbers + zero
3	Integers	$Z = \{\dots, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \dots\}$
4	Positive integers	$Z_+ = \{1, 2, 3, 4, 5, \dots\}$
5	Negative integers	$Z_- = \{\dots, -7, -6, -5, -4, -3, -2, -1\}$
6	Rational Number	A number is called rational if it can be expressed in the form p/q where p and q are integers ($q > 0$). Example : $\frac{1}{2}$, $\frac{4}{3}$, $\frac{5}{7}$, 1 etc.
7	Irrational Number	A number is called irrational if it cannot be expressed in the form p/q where p and q are integers ($q > 0$). Example : $\sqrt{3}, \sqrt{2}, \sqrt{5}, \pi$ etc
8.	Real Numbers:	All rational and all irrational number makes the collection of real number. It is denoted by the letter R

S.no	Terms	Descriptions
1	Euclid's Division Lemma	For a and b any two positive integer, we can always find unique integer q and r such that $a = bq + r$, $0 \leq r < b$ If $r = 0$, then b is divisor of a .



2	HCF (Highest common factor)	<p>HCF of two positive integers can be find using the Euclid's Division Lemma algorithm</p> <p>We know that for any two integers a, b. we can write following expression</p> $a=bq + r \quad , \quad 0 \leq r \leq b$ <p>If $r=0$,then</p> $\text{HCF}(a, b) =b$ <p>If $r \neq 0$, then</p> $\text{HCF} (a, b) = \text{HCF} (b,r)$ <p>Again expressing the integer b,r in Euclid's Division Lemma, we get</p> $b=pr + r_1$ $\text{HCF} (b,r)=\text{HCF} (r,r_1)$ <p>Similarly successive Euclid 's division can be written until we get the remainder zero, the divisor at that point is called the HCF of the a and b</p>
3	$\text{HCF} (a,b) =1$	Then a and b are co primes.
4	Fundamental Theorem of Arithmetic	Composite number = Product of primes
5	HCF and LCM by prime factorization method	<p>HCF = Product of the smallest power of each common factor in the numbers</p> <p>LCM = Product of the greatest power of each prime factor involved in the number</p>
6	Important Formula	$\text{HCF} (a,b) \times \text{LCM} (a,b) =a \times b$
7	Important concept for rational Number	<p>Terminating decimal expression can be written in the form</p> $p/2^n5^m$