Additional Reading Material for Polynomials

Algebraic expressions : A combination of constants and variables, connected by some or all of the operations(+, -, x, /) is an algebraic expression.

Polynomial

A polynomial is a mathematical expression involving a sum of powers in one or more variables multiplied by coefficients. A polynomial in one variable (a univariate polynomial) with constant coefficients is given by $a_n x^n + a_{n-1} x^{n-1} + \ldots + a_1 x + a_0$.

Degree of the Polynomial

The highest power of the variable in a polynomial, is the degree of the polynomial.

For example, 3x^7+4x^6+x+9. In this polynomial, degree is '7' .

Types of polynomials

There are different ways in which the polynomials can be categorized.

A polynomial can be named with its degree and also the number of terms it has.

Monomials - Polynomials containing only one term 3x, y, and 5y are examples of monomials.
Binomials - Polynomial that contains only two terms 2x+1 and y-3 are examples of binomials.
Trinomials - Polynomial that contains three terms 2y+5x+1 and y-x+7 are examples of trinomials.

There are quadrinomials (four terms) and so on, but these are usually just called as polynomials regardless of the number of terms they contain. Polynomials can contain an infinite number of terms.

If a polynomial has a degree of two, then it is called as a quadratic polynomial. If it has a degree of three, it is a cubic polynomial. If it has a degree of four, it is a quatric polynomial.

Remainder Theorem :

Let p(x) be any polynomial of degree greater than or equal to one and let 'a' be any real number. If p(x) is divided by the linear polynomial (x - a), then the remainder is p(a).

Dividend = (Divisor × Quotient) + Remainder.

In general, if p(x) and g(x) are two polynomials such that degree of p(x) $\geq$ degree of g(x) and g(x) $\neq 0$.

We can find the quotient q(x) and remainder r(x) of a polynomial using the relation below.

$p(x) = g(x)q(x) + r(x)$ where $r(x) = 0$ or degree of r(x) < degree of g(x).

Factor Theorem : If p(x) is a polynomial of degree $n > 1$ and 'a' is any real number, then x- a is a factor of p(x), if $p(a) = 0$
and its converse, if (x - a) is a factor of a polynomial p(x) then $p(a) = 0$.