

10.3 Height of a Parse Tree:

Definition: Given a well-formed formula ϕ , its height is defined to be 1 plus length of the longest path in the parse tree starting from the root.

Simple example of different arithmetic notations is as follows:

- $x+y$: Infix Notation
- $xy+$: Postfix Notation
- $+xy$: Prefix Notation

11 Mathematical Induction

- C.F. Gauss derived the formula of $\sum_{n=1}^n = \frac{n(n+1)}{2}$ as a child prodigy.
- One of the ways to prove this is by the use of mathematical induction.

Suppose, we wish to show $M(n), M \in N$.

1. **Base Case:** Natural number 1 has the property i.e. we have a proof of $M(1)$.
2. **Inductive Hypothesis:** We assume that $M(n)$ is true.
3. **Induction Step:** Prove that if $M(n)$ is true then $M(n+1)$ is true.