Principle of Mathematical Induction: To prove that P(n) is true for all positive integers n, we complete these steps:[ Basis Step: Show that P(1) is true. [ Inductive Step: Show that P(k) → P(k+1) is true for all positive integers k. [ To complete the inductive step, assuming the inductive hypothesis that P(k) holds for an arbitrary integer k, show that must P(k+1) be true.

Number of Subsets of a Finite Set: For an arbitrary nonnegative integer k, every set with k elements has 2^k subset.

Strong Induction: To prove that P(n) is true for all positive integers n, where P(n) is a propositional function, complete two steps: [ Basis Step: Verify that the proposition P(1) is true. [ Inductive Step: Show the conditional statement [P(1) ∧ P(2) ∧ … ∧ P(k)] → P(k+1) holds for all positive integers k.

Using Strong Induction in Computational Geometry: Theorem: A simple polygon with n sides, where n is an integer with n ≥ 3, can be triangulated into n - 2 triangles.

Well-Ordering Property: A set is well ordered if every subset has a least element.[ N is well ordered under ≤. [ The set of finite strings over an alphabet using lexicographic ordering is well ordered.

Recursively Defined Functions: A recursive or inductive definition of a function consists of two steps: [ Basis Step: Specify the value of the function at zero [ Recursive step: Give a rule for finding its value at an integer from its values at smaller integers

Recursive definitions of sets have two parts: The basis step specifies an initial collection of elements. [ The recursive step gives the rules for forming new elements in the set from those already known to be in the set.

String Concatenation: Two strings can be combined via the operation of concatenation. Let Σ be a set of symbols and Σ\* be the set of strings formed from the symbols in Σ. We can define the concatenation of two strings, denoted by @u2219, recursively as follows. [ Basis step: w @u220A Σ\*, then w @u2219 λ= w. [ Recursive step: If w1 @u220A Σ\* and w2 @u220A Σ\* and x @u220A Σ, then w1 @u2219 (w2x), = (w1 @u2219 w2)x.

Well-Formed Formulae in Propositional Logic: The set of well-formed formulae in propositional logic involving T, F, propositional variables, and operators from the set {@u00AC,∧,∨,→,@u2194}. [ Basis step: T, F, and s, where s is a propositional variable, are well-formed formulae. [ Recursive step: If E and F are well-formed formulae, then (@u00ACE), (E∧ F), (E∨ F), (E→ F), (E@u2194 F), are well-formed formulae.

Structural Induction: To prove a property of the elements of a recursively defined set, we use structural induction. [ Basis step: Show that the result holds for all elements specified in the basis step of the recursive definition. [ Recursive step: Show that if the statement is true for each of the elements used to construct new elements in the recursive step of the definition, the result holds for these new elements.