**Tabitha – (Simple) Induction**

**3 Proofs: Summation, Binomial Expansion Theorem/ or Pascal’s Triangle Thm, Fundamental Theorem of Algebra**

# Introduction

* Review on various types of Proofs
  + Direct Proofs – proofs that reflect the structure of the statement to be proved
  + Indirect Proofs – proofs that do not reflect such a structure; proves a statement that logically implies the statement to be proved
* Mathematical Induction and its uses
  + *Definition: What is Induction?*
    - Scientific Definition
    - Induction vs. Deduction
  + “An extended/infinite proof by cases”
  + A proof of (Simple) Induction – creating from the Principle of Well-Ordering (Appendix)
    - Proof by Contradiction – an indirect method
* (Why Induction works on , and not )

# Body

* The relationship between Induction and a proof by induction
  + A formal intuition behind induction – using information that you know to achieve the desired result (“Since n = 1 implies n = 2, and n = 2 implies n = 3 …, etc.”)
  + Dominoes
* Defining the proof by a familiar example -
* Predicates/Statements
* Defining a relevant subset of
* Base Cases
* Induction Hypothesis
* Induction Step

# Conclusion/Questions

* A note on elegance with proofs
  + If there’s an easier way that uses less machinery, its probably better to use it
* Question: Squared Sums, Cubed Sums
* Challenge: shape
* *Theorem: Fundamental Theorem of Algebra*

# Draft 1