Tutorial 8

CSCI2110/MATH2080: Discrete Mathematics

5.1 - Mathematical Induction

5.3 - Recursive Definitions and Structural Induction

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Question 1 - An Inductive Inequality

(Rosen 20/351) Prove that $3^n < n!$ if n is an integer greater than 6.

Question 2 - Bernoulli's Inequality

(Rosen 25/351) Prove that if $h > -1$ then $1 + nh \leq (1 + h)^n$ for all negative numbers n. This is called Bernoulli's inequality.

Question 3 - Power Rule of Derivatives

(Rosen 57/353) Use mathematical induction to prove that the derivative of $f(x) = x^n$ equals nx^{n-1} whenever n is a positive integer. (For the inductive step, use the product rule for derivatives.)