CS 135 Discrete Structures

Homework Assignment #5: Induction

All problems taken from 'Rosen' with the exception of a few custom problems at the end of the assignment.

Remember to include the Pledge on your submission.

Section 5.1

- #3[all]
- #31 (prove via induction)

Section 5.2

- #6

Section 5.3

- #3[only a]
- #13 [Note: Look at the header for this sections of problems where it is stated that f_n is the n^{th} Fibonacci number, and thus you may use the recursive definition of a Fibonacci number]

- Prove by induction on the length of the input list that the following program (in the box below) correctly returns #t for an input list that represents a strictly increasing sequence of numbers and returns #f otherwise.

```
(define (increasing? numList)
   (if (or (null? numList) (null? (cdr numList)))
      #t
      (if (>= (car numList) (cadr numList))
         #f
         (increasing? (cdr numList)))))
```