CECS 228 Name:

Lab 8.2 ID: Date:  
Objective:

* Be able to use mathematical induction
* Be able to solve recurrence relation

Exercise 1: Let P(n) be the statement that for the positive integer n.

a) What is the statement P(1)?

b) Show that P(1) is true, completing the basis step of the proof.

c) What is the inductive hypothesis?

d) What do you need to prove in the inductive step?

e) Complete the inductive step, identifying where you use the inductive hypothesis.

f ) Explain why these steps show that this formula is true whenever n is a positive integer.

Exercise 2: Use mathematical induction to prove the inequality  
for all positive integers n ≥ 2.

Exercise 3: Prove that 1 · 1! + 2 · 2!+· · ·+n · n! = (n + 1)! – 1 whenever n is a positive integer.

Exercise 4: Prove that 6 divides n3 − n whenever n is a nonnegative integer.

Exercise 5:  
a) an = an-1 + 6an-2 for n ≥ 2, a0 = 3, a1 = 6

b) an = 7an-1 − 10an-2 for n ≥ 2, a0 = 2, a1 = 1

c) an= 2an−1 – an-2 for n ≥ 2, a0 = 4, a1 = 1

Exercise 6: Find the solution to an = 5an-2 − 4an-4 with a0 = 3, a1 = 2, a2 = 6, and a3 = 8.