Assignment#5 – CECS 228

1. Prove that 1 · 1! + 2 · 2!+· · ·+n · n! = (n + 1)! – 1 whenever n is a positive integer.  
  
2. Prove that if A1, A2, … , An are subsets of a universal set U, then

3. For which nonnegative integers n is 2n + 3 ≤ 2n? Prove your answer.  
  
4. Suppose that,

where a and b are real numbers. Show that

for every positive integer n.  
  
5. Prove that 2 divides n2 + n whenever n is a positive integer.

6. Construct a tiling using right triominoes of the 8 × 8 checkerboard with the square in the upper left corner removed. Hint: (Proof by Constructive Existence)

7. Find the solution to an = 7an-2 + 6an-3 with a0 = 9, a1 = 10, and a2 = 32.  
  
8. Solve these recurrence relations together with the initial conditions given.

an = 5an-1 − 6an-2 for n ≥ 2, a0 = 1, a1 = 0