CS220 Spring 2018 Written Homework 1: Induction

name:

id:

1. Prove using induction that the predicate P(n): 1*1! + 2*2! + ... +n*n! = (n+1)! - 1 is true for any positive integer n.

a) Show that P(1) is true, completing the base of the induction.

b) What do you need to prove in the inductive step? Write out P(k) →P(k+1) for this particular case.

c) Complete the inductive step.

2a) Find a formula for $\frac{1}{1*2}+\frac{1}{2*3}+\ldots+\frac{1}{n*(n+1)}$ by examining the values of this expression for small values of n.

2b) Prove the formula you found by induction. Follow the format of question 1.