Homework 7:

I pledge my honor that I have abided by the Stevens Honor System.

5.1: 14, 18(just prove), 5.2: 4

5.1:

14. Prove that, for every positive integer , .

Base Case:

Inductive Case:

Ind. Hip.:

Inductive Step:

By Inductive Hyp.

Arithmetic

Arithmetic

Arithmetic

Arithmetic

When is true, is also true. is also true, so is true for all positive integers .

18. Let be the statement that , where integer .

Base Case:

Inductive Case:

Inductive Hypothesis: for

Inductive Step:

Def. !

by Inductive Hyp.

Arithmetic

Arithmetic

5.2:

4. Let be the statement that a postage of n cents can be formed using just 4-cent stamps and 7-cent stamps. The parts of this exercise outline a strong induction proof that is true for .

1. Show statements , , , and are true, completing the basis step of the proof.
2. What is the inductive hypothesis of the proof?

Inductive Hypothesis:

for cents postage.

1. What do you need to prove in the inductive step?

Inductive step:

Prove, assuming the Inductive Hyp. is true, that you can form cents of postage.

1. Complete the inductive step for .

is true, since .

If you add one 4-cent postage stamp, is true.

1. Explain why these steps show that this statement is true whenever .

Both the base case and the inductive case are true, so by the principle of Strong Induction, the statement is true for all integers .