Section 5.2, Problem 4: Let $P(n)$ be the statement that a postage of $n$ cents can be formed using just 4-cent stamps and 10-cent stamps. The parts of this exercise outline a strong induction proof that $P(n)$ is true for $n \geq 18$

a. Show statements $P(18), P(19), P(20), P(21)$ are true, completing the basis step of the proof.

b. What is the inductive hypothesis?

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

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

e. Complete the inductive step for $k \geq 21$.

f. Explain why these steps show that this inequality is true whenever $n \geq 18$.

Section 5.2, Problem 14: Suppose you begin with a pile of $n$ stones and split this into $n$ piles of one stone each by successively splitting a pile of stones into two smaller piles. Each time you split a pile, you multiply the number of stones in each of the smaller piles you form, so that if these piles have $r$ and $s$ stones in them, respectively, you compute $rs$. Show that no matter how you split the piles, the sum of all the products computed at each step equals $\frac{n(n+1)}{2}$.