

5.2 Strong Induction and Well-Ordering

5.2 pg 341 # 3

Let $P(n)$ be the statement that a postage of n cents can be formed using just 3-cent stamps and 5-cent stamps. The parts of this exercise outline a strong induction proof that $P(n)$ is true for $n \geq 8$.

- a) Show that the statements $P(8)$, $P(9)$, and $P(10)$ are true, completing the basis step of the proof.
- b) What is the inductive hypothesis of the proof?
- c) What do you need to prove in the inductive step?
- d) Complete the inductive step for $k \geq 10$.
- e) Explain why these steps show that this statement is true whenever $n \geq 8$.

5.2 pg 342 # 7

What amounts of money can be formed using just two-dollar bills and five-dollar bills? Prove your answer using strong induction.

5.2 pg 343 # 25

Suppose that $P(n)$ is a propositional function. Determine for which positive integers n the statement $P(n)$ must be true, and justify your answer, if

- a) $P(1)$ is true; for all positive integers n , if $P(n)$ is true, then $P(n + 2)$ is true.
- b) $P(1)$ and $P(2)$ are true; for all positive integers n , if $P(n)$ and $P(n + 1)$ are true, then $P(n + 2)$ is true.
- c) $P(1)$ is true; for all positive integers n , if $P(n)$ is true, then $P(2n)$ is true.