Problem §5.2: 8: Suppose that a store offers gift certificates in denominations of 25 and 40 dollars. Determine the possible total amounts you can form using these gift certificates. Prove your answer using strong induction.

Problem §5.2: 10: Assume that a chocolate bar consists of n squares arranged in a rectangular pattern. The entire bar, a smaller rectangular piece of the bar, can be broken along on a vertical or horizontal line separating the squares. Assuming that only one piece can be broken at a time, determine how many breaks you must successively make to break the bar into n separate squares. Use strong induction to prove your answer.

Problem §6.1: 8: How many different three-letter initials with none of the letters repeated can people have?

Problem §6.1: 14: How many bit strings of length n, where n is a positive integer, start and end with 1s?

Problem §6.1: 16: How many strings are there of four lowercase letters that have the letter x in them?

Problem §6.1: 26: How many strings of four decimal digits

(a) do not contain the same digit twice?

(b) end with an even digit?

(c) have exactly three digits that are 9s?

Problem §6.1: 30: How many license plates can be made using either three uppercase English letters followed by three digits or four uppercase English letters followed by two digits?

Problem §6.1: 36: How many functions are there from the set $\{1, 2, \ldots, n\}$, where n is a positive integer, to the set $\{0, 1\}$?

Problem §6.1: 37: How many functions are there from the set $\{1, 2, \ldots, n\}$, where n is a positive integer, to the set $\{0, 1\}$

(a) that are one-to-one?

(b) that assign 0 to both 1 and n?

(c) that assign 1 to exactly one of the positive integers less than n?

Problem §6.1: 40: How many subsets of a set with 100 elements have more than one element?

Problem §6.1: 44: How many ways are there to seat four of a group of ten people around a circular table where two seatings are considered the same when everyone has the same immediate left and immediate right neighbor?

Problem §6.2: 2: Show that if there are 30 students in a class, then at least two have last names that begin with the same letter.

Problem §6.2: 6: Let d be a positive integer. Show that among any group of $d+1$ (not necessarily consecutive) integers there are two with exactly the same remainder when they are divided by d.

Problem §6.2: 8: Show that if f is a function from S to T, where S and T are finite sets with $|S| > |T|$, then there are elements s_1 and s_2 in S such that $f(s_1) = f(s_2)$, or in other words, f is not one-to-one.

Problem §6.2: 14:

(a) Show that if seven integers are selected from the first 10 positive integers, there must be at least two pairs of these integers with the sum 11.

(b) Is the conclusion in (a) true if six integers are selected rather than seven?