Math 483 HW 3 2023. Due Thursday, Aug. 31. Two pages problems 1)-8).

Problems from chapter 2 (7th edition).

problem

1) 2.26 A divining rod is used to indicate the presence of water by dipping downward where a well should be dug. To test a divining rod expert, 4 cans are buried: two contain water and two are empty. The expert is told to test the 4 cans and decide which two contain water.

a) List the sample space for this experiment.

b) If the divining rod is completely useless for locating water, what is the probability that the expert will correctly identify (by guessing) both of the cans containing water?

comment Let N1 and N2 be the empty cans and let W1 and W2 be the cans full of water. Then N1N2 is one outcome. Assume that order does not matter (so N1N2 and N2N1 are the same). If the expert guesses, then the outcomes are equally likely.

2) The census reports that the median family income for all families in the USA during 1991 was $35,353. So half of American families had incomes exceeding this amount and half had incomes equal or below this amount. Suppose that four families are surveyed and each one reveals whether its income exceeded $35,353 in 1991. List the points in the sample space.

comment Use Y if the family's income exceeded the median and N otherwise. Then finding S is similar to finding S when a coin is flipped 4 times except a typical outcome has the form YYYY, YYYN, etc. Should be 16 outcomes.

3) 2.35 An airline has six flights from New York to California and seven flights from California to Hawaii per day. If flights are to be made on separate days, how many different flight arrangements can the airline offer from New York to Hawaii?

comment multiplication (mn) rule See p. 41-42.

4) 2.38 A restaurant offers a special menu in which, a diner can select from four appetizers, three salads, four entrees and five desserts. How many different dinners are available if a dinner consists of one appetizer, one salad, one entree and one dessert?

comment multiplication (mn) rule See p. 41-42.

5)2.41 How many different seven-digit telephone numbers can be formed if the first digit cannot be zero?

comment Multiplication rule, 1st slot differs from the remaining six.

6)2.42 A personnel director for a company has hired ten new engineers. If three distinctly different positions open at the Cleveland plant, how many ways can she fill the positions?

comment Distinct positions so this is a permutation. See p. 43-44.

7)2.43 A fleet of nine taxis is to be dispatched to three airports in such a way that three go to airport A, five go to airport B and one goes to airport C. In how many distinct ways can this be done?

comment Combines the mn rule with combinations. Let the 1st slot be ‘‘A taxis," the 2nd slot ‘‘remaining taxis for B," and the third slot ‘‘remaining taxis for C."

8)2.55a A study is to be conducted at a hospital to determine attitudes of nurses towards various administrative positions. A sample of 10 nurses is to be selected from a total of 90 nurses employed at the hospital. How many different samples of 10 nurses can be selected?

comment Order is not important so this is a combination. See p. 46. Do not simplify the binomial coefficient.