MATH 460: Probability & Statistics — January_2019

Chapter 1: Basic Probability

Homework #2 — Dr. Basilio

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DUE: Mon Jan_14 ∪ Tues Jan_15

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Fundamental Principle of Counting

Problem 1: Fundamental Principle of Counting

(a) How many different 4-digit PINs are there that are EVEN numbers? (Recall that there are ten digits: 0–9.)

(b) A standard license plate for a car in California has one digit followed by three letters followed by three more digits. Unless stated assume you can repeat letters/numbers. How many are possible:

(i) With no restrictions?

(ii) With no repeated digits or letters?

(iii) That start with one?

(iv) That do NOT start with one?

(v) That have the word "BIG"

Permutations

Problem 2: Permutations

Calculate the following:

(a) $15!$

(b) ${}_4P_2$

(c) ${}_7P_5$

Problem 3: Permutations

In how many ways can 7 books be arranged on a shelf if

(a) any arrangement is possible

(b) 3 particular books must always stand together

(c) two particular books must occupy the ends?

Combinations

Problem 4: Combinations

Calculate the following:

(a) ${}_5C_3$

(b) ${}_8C_4$

Problem 5: Permutations and Combinations

(a) In how many ways can 6 questions be selected out of 10?

(b) Find the number of combinations and permutations of 4 letters each that can be made from the letters of the word Tennessee (i) if you are allowed to repeat letters and (ii) if you are not allowed to repeat letters.

(c) Dealing three cards from a standard deck of cards, how many ways can I get each of the following?

(i) Three Hearts

(ii) Three Kings

(iii) Two Kings and a Queen

Chapter 5: Sampling Theory

Organizing and Visualizing Data

Measurements of Central Tendency

Problem 6: Mean

Suppose 6 students take an exam and the mean score is 80%. Five of the students scores are: 95,78,85,56, 96. What is the sixth student's score?

Problem 7: Mean-Median-Mode-Range

(a) The front row in a movie theatre has 23 seats. If you were asked to sit in the seat that occupied the median position, in which seat would you have to sit?

(b) What is the median score achieved by a student who recorded the following scores on 10 math quizzes? Scores: $S = \{68, 55, 70, 62, 71, 58, 81, 82, 63, 79\}$.

(c) The number of service upgrades sold by each of 30 employees is as follows:

$$\{32, 6, 21, 10, 8, 11, 12, 36, 17, 16, 15, 18, 40, 24, 21, 23, 24, 24, 29, 16, 32, 31, 10, 30, 35, 32, 18, 39, 12, 20\}$$

Find the mean, median, and mode of the service upgrades.

Measurement of Dispersion

Problem 8: Standard Deviation

Find the standard deviation of the data set $S = \{3123, 1040, 1511, 2124, 1332, 2154, 5132, 6160\}$.

Problem 9: Five-Number-Summary

(a) Find the five number summary, and draw a Box-Whisker plot for $S = \{3, 7, 8, 5, 12, 14, 21, 15, 18, 14\}$.

(b) Find the standard deviation for the set from part (a).