MATH 460: Probability & Statistics — January_2019

Ch 1: Basic Probability ∪ Ch 5 Sampling Theory

In-Class Activity #2 — Dr. Basilio

Wed Jan_9 ∪ Thurs Jan_10

SCIT Southern California Institute of Technology

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Fundamental Principle of Counting

Activity 1: FPoC

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

(b) You have bought 4 new books and you want to display them on your bedroom shelf. You have A: *Alice in Wonderland*, B: *Bleak House*, C: *Crime and Punishment*, D: *Don Quixote of La Mancha*. How many different ways can we actually organize these 4 books?

(c) In Georgia car license plates have three digits followed by three letters. 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 zero?

(iv) That do NOT start with zero?

(v) That have the word "DOG"

Permutations

Activity 2: Permutations

Calculate the following:

(a) $10!$

(b) ${}_8P_5$

(c) ${}_4P_4$

Activity 3: Permutations and Combinations

(a) In how many ways can 10 people be seated on a bench if only 4 seats are available?

(b) Castel and Joe are planning trips to three countries this year. There are 7 countries they would like to visit. One trip will be one week long, another two days, and the other two weeks. How many possibilities are there?

Combinations

Activity 4: Combinations

Calculate the following:

(a) ${}_{12}C_{10}$

(b) ${}_{7}C_{7}$

Activity 5: Permutations and Combinations

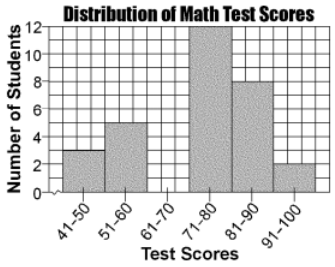
(a) In how many ways can 10 objects be split into two groups containing 4 and 6 objects, respectively?

(b) In how many ways can a team of 17 softball players choose three players to refill the water cooler?

Organizing and Visualizing Data

Activity 6: Frequency Distributions

The graph below shows the distribution of scores of 30 students on a mathematics test.



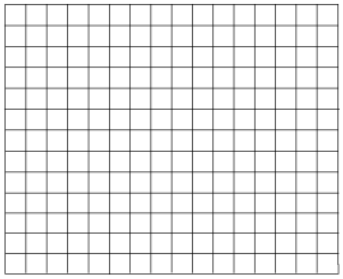
Complete the frequency table below using the data in the frequency histogram shown.

Test Scores	Frequency
91-100	
81-90	
71-80	
61-70	
51-60	
41-50	

Activity 7: Frequency Distributions

(a) The scores on a mathematics test were 70, 55, 61, 80, 85, 72, 65, 40, 74, 68, and 84. Complete the accompanying table, and use the table to construct a frequency histogram for these scores.

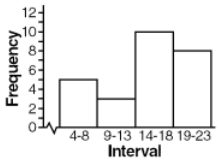
Score	Tally	Frequency
40-49		
50-59		
60-69		
70-79		
80-89		



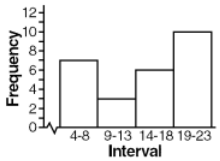
(b) Which one of the following histograms represents the data in the table below?

Interval	Frequency
4-8	8
9-13	3
14-18	10
19-23	5

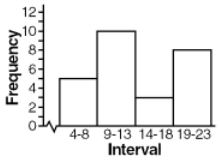
A)



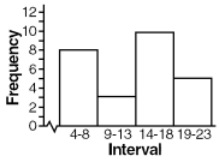
C)



B)



D)



Measurements of Central Tendency

Activity 8: Mean-Median-Mode-Range

(a) Consider the data set $S = \{2, 5, 9, 3, 5, 4, 7\}$. Compute the mean.

(b) Consider the data sets $A = \{2, 5, 9, 3, 5, 4, 7\}$ and $B = \{2, 5, 9, 3, 5, 4\}$. Compute the median of each data set. (Don't forget to re-order the data first!)

(c) Consider the data sets $A = \{2, 5, 9, 3, 5, 4, 7\}$, $B = \{2, 5, 2, 3, 5, 4, 7\}$, $C = \{2, 5, 2, 7, 5, 4, 7\}$. Compute the mode(s) of each data set.

(d) Consider the data set $S = \{2, 5, 9, 3, 5, 4, 7\}$. Compute the range of the data set.

Measurement of Dispersion

Activity 9: Five-Number-Summary

(a) Find the five number summary, and draw a Box-Whisker plot for $S = \{15, 25, 20, 29, 29, 36, 29, 15, 26, 28, 24, 25\}$.

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

Activity 10: 1-Var Stats

Let $S = \{123, 100, 111, 124, 132, 154, 132, 160\}$ be our data set. Find:

(a) Mean, Median, and Mode

(b) Standard Deviation

(c) What does the standard deviation mean in this case?

Activity 11: Five-Number-Summary

(a) Find the five number summary, and draw a Box-Whisker plot for $S = \{42, 20, 31, 10, 5, 3, 2, 1, 67, 53, 44\}$.

(b) Find the standard deviation for the set from problem 4.