MATH 460: Probability & Statistics — January_2019

Ch 2 Probability Distribution Functions ∪ Ch 4 Special Distributions

In-Class Activity #3 — Dr. Basilio

Mon Jan_14 ∪ Tues Jan_15

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Chapter 5: Sampling Theory

Activity 1: 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 2: 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 part (a).

Chapter 2: Random Variables and Probability Distributions

Probability Distributions

Activity 3: Probability Distribution

Find the probability distribution for rolling a dice. Let X be the random variable of rolling a dice. Plot a bar graph for the probability distribution.

x	$P(X = x)$
1	
2	
3	
4	
5	
6	

Activity 4: Probability Distribution

Suppose that a dice is to be tossed twice, and let the random variable X denote the sum of the two tosses. Find the probability distribution for X. Plot a bar graph for the probability distribution.

x	$P(X = x)$
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Activity 5: Probability Distribution

An urn holds 4 red marbles and 6 black marbles. If 2 marbles are to be drawn at random without replacement and X denotes the number of red marbles, find the probability distribution for X.

Hint: $S = \{RR, RB, BR, BB\}$.

Activity 6: Expectation

Suppose that a game is to be played with a single die assumed fair. In this game a player wins \$20 if a 2 turns up, \$40 if a 4 turns up; loses \$30 if a 6 turns up; while the player neither wins nor loses if any other face turns up.

(a) State what the random variable X is

(b) Find all the outcomes $x_1, \ldots, x_6$

(c) Find all the probabilities for each respective outcome

(d) Find the expected sum of money to be won (or lost).

(e) In a fair game, what do you think is a reasonable buy-in is in order to play the game?

Activity 7: Expectation

A game is played where a player rolls a six sided die and if the result is an even number, they win 4 times the number in dollars, but if the result is odd, they lose 6 times the number in dollars. Find the expected winnings (or losings).

(a) Find the expected winnings (or losings).

(b) Even if the game is free, should you play?

Activity 8: Frequency-Skewness

The following is a list of prices (in dollars) of birthday cards found in various drug stores:

1.45	2.20	0.75	1.23	1.25
1.25	3.09	1.99	2.00	0.78
1.32	2.25	3.15	3.85	0.52
0.99	1.38	1.75	1.22	1.75

(a) Organize this data with intervals of 50 cents (i.e. .50-0.99, 1.00-0.49, and so on) using create a frequency distribution table.

(b) Draw a Histogram of the data. State the skewness of the data.

Binomial Distribution

Activity 9: Binomial-Distribution-Probability

For each part, please label the n, X, and p in addition to your work and answer. Leave answers as decimals and round to three decimal places.

Find the probability that in tossing a fair coin three times, there will appear

(a) three heads

(b) two tails and a head

(c) at least one head

(d) not more than one tail

Activity 10: Binomial-Distribution-Probability

For each part, please label the n, X, and p in addition to your work and answer. Give answers as percentages and round to one decimal place.

Find the probability that in five tosses of a fair die, a 3 will appear

(a) twice

(b) at most once

(c) at least two times