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Psychology 317 Exam #3
February 15, 2017

Instructions

1. Use a pencil, not a pen
2. Put your name on each page where indicated, and in addition, put your section on this page.
3. Exams will be due at 10:20!
4. If you find yourself having difficulty with some problem, go on to the rest of the problems, and return to the troublemaker if you have time at the end of the exam.
5. Leave your answers as reduced fractions or decimals to three decimal places.
6. **CIRCLE ALL ANSWERS: You will lose credit if an answer is not circled!!**
7. Check to make sure that you have all questions (see grading below)
8. **SHOW ALL YOUR WORK: An answer that appears from nowhere will receive no credit!!**
9. Don't Panic!
10. Good luck!

Grading

Problem	Points	Grader
1a-b	35	Adam
2a-c	20	Dominic
3a-d	45	Yiyu
TOTAL	/100	

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1. You will recall that the "Lynnwood Game" from Exam 2 works as follows. The GameMaster repeatedly throws a die until the die comes up a “5”. At that point, the game stops and the player wins a value (in dollars) equal to three times the number of throws or $10.00, *whichever is less*.

The members of V, along with the probability of each member of V along with the vp(v) values are provided in the table below.

NOTE: We’ve left enough room at the right of the table for you to enter other things, should you wish.

Number of throws	v (dollars)	p(v)	vp(v)
1	$3	0.167	0.500
2	$6	0.139	0.833
3	$9	0.116	1.042
>3	$10	0.579	5.787
Sums		1.000	8.612

a) Suppose you play the Lynnwood Game 900 times. Each time you play, you record the amount you win. So you will wind up with 900 numbers.

What would you expect the variance, standard deviation, the *mode*, and the *sum of the 900 squared numbers* to be? (20 points)

b) Repeat Part a, but assume you play the Lynnwood Game 9,000 times. (15 points)

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2. The Lynnwood Lottery sells tickets that contain four characters. Each character is randomly selected from a set of 34 characters: the digits 2-9, and all 26 letters. Thus a lottery ticket might look like this,

Lynnwood Lottery ticket
7 K 2 K

or this,

Lynnwood Lottery ticket
8 5 7 8

or this,

Lynnwood Lottery ticket
B K 2 9

and so on.

NOTE: As illustrated by the examples, it's perfectly possible for any character to occur more than once.

a) How many distinct lottery tickets can there be? (10 points)

b) How many distinct lottery tickets are there containing exactly 3 letters? (5 points)

c) What is the probability that a randomly chosen lottery ticket contains exactly 3 letters? (5 points)

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3. A Livfreor die (named for its inventor, Horace Livfreor) is a die that is biased to come up a "5" with a probability of $p = 0.40$, and the other five numbers with equal probabilities.

a) Suppose a Livfreor die is thrown 10 times. *Use the binomial formula* to compute the probability that exactly three 5's result out of the 10 throws. **Be sure to show your work** (25 points)

For Parts b-c, assume the following: you toss a Livfreor die 25 times and write down the number of 5's you get. Call this a "play." Then you repeat this process 10,000 times, i.e., you carry out 10,000 plays.

b) Read over Parts c-d of this problem. *Briefly* explain why the "10,000 times" part of this problem is irrelevant for the answers to parts c and d (you can consider this question to be a kind of hint). (10 points)

c) Across the 10,000 plays, what would you expect the mean, variance, and standard deviation of the *number* of 5's on each play to be? (5 points)

d) Across the 10,000 plays, what would you expect the mean, variance, and standard deviation of the *proportion* of 5's on each play to be? (Give your answers to 4 decimal places). (5 points)