

PID: _____

Last Name, First Name: _____

Section: _____

Homework 2
Math 183, UCSD, Fall 2017
Due on Friday 13th, October 12:50pm
Staple pages together

Exercise 1

The Behavioral Risk Factor Surveillance System (BRFSS) is an annual telephone survey designed to identify risk factors in the adult population and report emerging health trends. The following table summarizes two variables for the respondents: health status and health coverage, which describes whether each respondent had health insurance.

		<i>Health Status</i>					Total
		Excellent	Very good	Good	Fair	Poor	
<i>Health Coverage</i>	No	459	727	854	385	99	2,524
	Yes	4,198	6,245	4,821	1,634	578	17,476
	Total	4,657	6,972	5,675	2,019	677	20,000

1. If we draw one individual at random, what is the probability that the respondent has excellent health and doesn't have health coverage?

2. If we draw one individual at random, what is the probability that the respondent has excellent health or doesn't have health coverage?

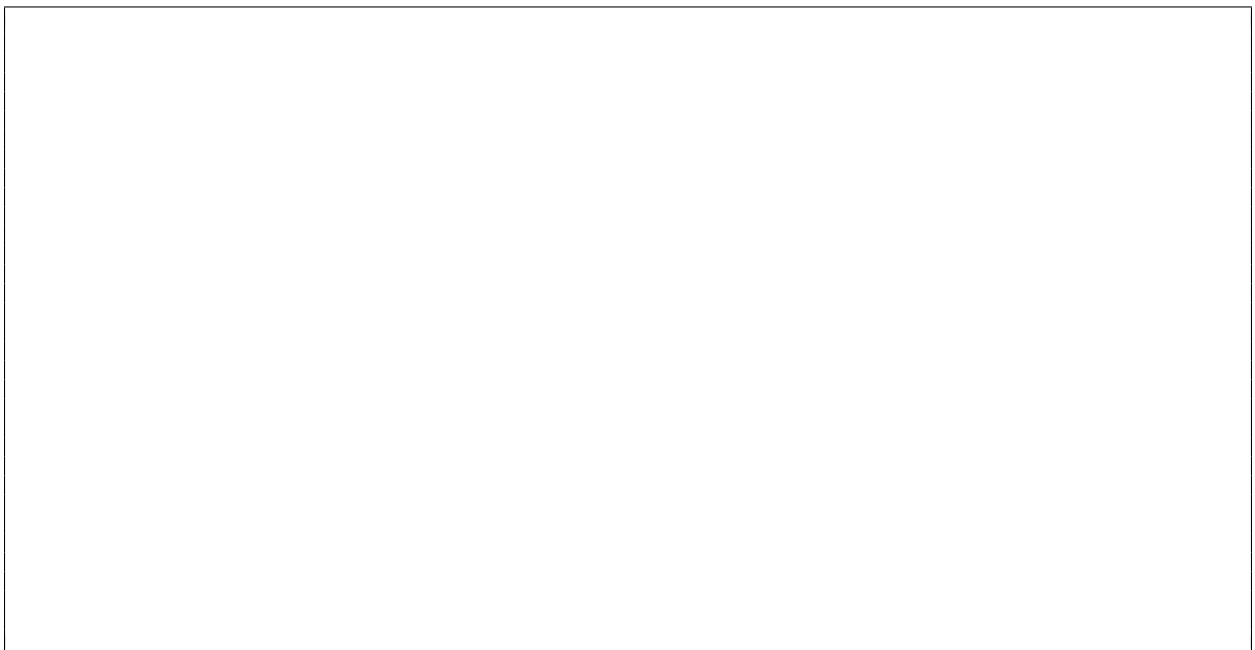
Exercise 2

After a statistics course, 86% of students know the formula for standard deviation. Among those who know this formula, 80% passed, but only 56% of those students who did not know the formula passed.

1. Construct a tree diagram of this scenario.



2. Compute the probability that a student know the formula for standard deviation if it is known that he/she passed.



Exercise 3

Five fair dice are rolled. What is the probability that exactly three faces show one number and two faces show a second number?

Exercise 4

Imagine you have an urn containing 5 red, 3 blue, and 2 orange marbles in it.

1. What is the probability that the first marble you draw is blue?

2. Suppose you drew a blue marble in the first draw. If drawing with replacement, what is the probability of drawing a blue marble in the second draw?

3. Suppose you instead drew an orange marble in the first draw. If drawing with replacement, what is the probability of drawing a blue marble in the second draw?

4. If drawing with replacement, what is the probability of drawing two blue marbles in a row?

5. When drawing with replacement, are the draws independent? Explain.

Exercise 5

Consider a box containing four balls: one red, one green, one blue, and one tricolor (=red,green and blue). You draw one ball from the box. Consider the three events:

$$R = \{\text{the drawn ball contains red}\}$$

$$G = \{\text{the drawn ball contains green}\}$$

$$Y = \{\text{the drawn ball contains red and green}\}$$

1. Are R and G independent?

2. Are G and Y independent?

3. Are R and Y independent?

4. Let A, B, C be three events. Is the following statement true? Justify your answer.

“If A and B are independent, and B and C are independent, then A and C are independent.”

Exercise 6

You play the following game from a well-shuffled deck of 52 cards. If you draw a black card, you win \$1. If you draw a heart, you win \$4. For any diamond, you win \$7, plus an additional \$15 for the king or ace of diamonds.

1. Create a probability model for the amount you win playing this game. Find the expected value and standard deviation for this model.

2. On average, what is the most a person should be willing to pay to play this game if the goal is to make a profit?

3. Assume there is no fee to play. If you play the game each day of the week (7 days/week), what do you expect your weekly earnings to be? What is the standard deviation of the weekly totals?