Probability

Class Activity 6

Due: Wednesday at noon

Name:_____

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1. Researchers studying the effect of antibiotic treatment for acute sinusitus compared to symptomatic treatments randomly assigned 166 adults diagnosed with acute sinusitis to one of two groups: treatment or control. Study participants received either a 10-day course of amoxicillin (an antibiotic) or a placebo similar in appearance and taste. The placebo consisted of symptomatic treatments such as acetaminophen, nasal decongestants, etc. At the end of the 10-day period, patients were asked if they experienced an improvement in symptoms. The distribution of responses is shown below:

	Yes	No	Total
Treatment	66	19	85
Control	65	16	81
Total	131	35	166

Let the following events be denoted:

$$T = \text{treatment group}$$
$$C = \text{control group}$$
$$I = \text{improvement in symptoms}$$
$$I^c = \text{no improvement in symptoms}$$

(a) What proportion of participants in the treatment group experienced improvement in symptoms?

(b) A participant is randomly selected. Using probability notation, describe the probability that they are in the group described in part (a).

(c) What is the probability that a randomly selected individual is in the treatment group or experienced improvement in symptoms?

2. In your sock drawer you have 7 blue, 5 gray, and 4 black socks. Half asleep one morning you grab 2 socks at random and put them on. Find the probability you end up wearing:
   (a) Two blue socks

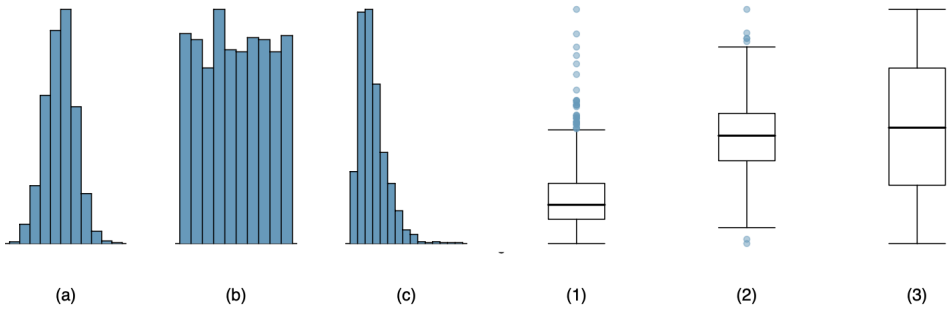
   (b) no gray socks

   (c) a green sock

   (d) matching socks

3. A recent article in a college newspaper stated that college students get an average of 5.5 hrs of sleep each night. A student who was skeptical about this value decided to conduct a survey by randomly sampling 25 students. On average, the sampled students slept 6.25 hours per night. Identify which value represents the sample mean and which value represents the claimed population mean.

4. Three data sets are represent below with both a histogram and a boxplot. Match each histogram with the box plot that represents the same data set.



5. Sally wears sunscreen 50% of days during the summer. She goes swimming 15% of the days during the summer. The probability that she wears sunscreen given that she went swimming is 90% . On a random day in the summer find the probability that Sally:
   (a.) went swimming and wore sunscreen.

   (b) went swimming or wore sunscreen.

6. Suppose we are measuring characteristics of Davidson students. Provide examples of the following types of data you can collect:
   qualitative nominal:

   qualitative ordinal:

   quantitative discrete:

   quantitative continuous:

8. Given the following information about a data set:

Min	Q_1	Q_2	Q_3	Max
5	12	28	52	99

Can you conclude that there are any outliers in the data set?

9. Sophia who took the Graduate Record Examination (GRE) scored 158 on the Verbal Reasoning section and 157 on the Quantitative Reasoning section. The mean score for Verbal Reasoning section for all test takers was 151 with a standard deviation of 7, and the mean score for the Quantitative Reasoning was 153 with a standard deviation of 7.67. Suppose that both distributions are symmetric and bell shaped.
   (a) What is Sophia's Z-score on the Verbal Reasoning section?

   (b) What is Sophia's Z-score on the Quantitative Reasoning section?

   (c) Which did she perform better on relative to other people?

   (d) Approximately what percentage of people performed better than her on the Verbal Reasoning section?