

**Instructions:** All work must be shown that supports the final answer. A calculator may be used, but the formulas and appropriate work must be shown to support the final answer, even if it was achieved using a calculator. You may not use any human help for the completion of this exam. Use of your homework, tests, notes, book and non-human internet support is acceptable. Good luck! This quiz is due at 1:15 on Monday, June 30. You have a fifteen minute grace period. After 1:15 the percent possible will go down by 20% every 15 minutes that it is late (at 1:15 you can only get an 80%, at 1:30 you can only get a 60%, at 1:45 you can only get 40%, at 2:00 you can only get 20%.)

1. For the following data which are the ages of US Presidents on their respective inauguration days, answer the questions that follow:  
57, 61, 57, 57, 58, 57, 61, 54, 68, 51, 49, 64, 50, 48, 65,  
52, 56, 46, 54, 49, 50, 47, 55, 55, 54, 42, 51, 56, 55, 51,  
54, 51, 60, 62, 43, 55, 56, 61, 52, 69, 64, 46, 54
  - a) Find the variance and then calculate the standard deviation.
  - b) Give the 5 number summary for the data. Show indicator/locator functions for median and 1<sup>st</sup> quartile.
  - c) Create a boxplot for the data. Don't forget to scale it.
  - d) Using both the boxplot, what are your observations about the shape of the data?
  - e) Now use the criteria for skewness to support or question your visual inspection of the shape of the data using the boxplot.

- f) Calculate the z-score for the data point that represents the median and the 3<sup>rd</sup> quartile.
  
- g) For this data, which is more appropriate the Empirical Rule or Chebyshev's Rule? Why? (The why must be answered for full credit.)
  
- h) What percent of the data would you expect to find within 2 standard deviations of the mean? Be sure to indicate how you arrived at the percentage.
  
- i) In what range would you expect to find the percentage of data that you indicated in h)?
  
- j) What is the actual percentage of data between the 2 points indicated in i)? If a point is an actual data point, use it in the calculation.

2. An OB/GYN wants to learn whether the amount of prenatal care and the expectation of a pregnancy are associated. In an attempt to investigate, he randomly selected 939 women and asked them if their pregnancy has been intended, unintended or mistimed and if they had received prenatal care before 3 months, sometime between 3 to 5 months or after 5 months (or never). Based on the following information, answer the questions below. Use correct round-off.

593 intended pregnancies and 64 unintended pregnancies received care before 3 months, 26 intended pregnancies and 19 mistimed pregnancies received care sometime between 3 and 5 months and 11 unintended pregnancies and 16 mistimed pregnancies received care after 5 months. There were a total of 652 intended pregnancies, 83 unintended pregnancies and 204 mistimed pregnancies.

- a) Create a contingency table to summarize the data.

- b) What is the probability that a randomly chosen pregnancy was unintended?
- c) What is the probability that a randomly chosen pregnancy was unintended or mistimed?
- d) What is the probability that a randomly chosen pregnancy was mistimed or care was received after 5 months?
- e) What is the probability that a randomly chosen pregnancy was unintended and care was received after 5 months?
- f) What is the probability that a randomly chosen unintended pregnancy received care after 5 months?
3. There are 34 peanut butter M&M's (the others are all chocolate) in my jar which contains 100 M&M's. What is the probability of randomly selecting
- a) A peanut butter M&M from the jar?
- b) A non-peanut butter M&M from the jar?
- c) If I pick up a handful of 5 M&M's are these 5 M&M's that I chose considered independent events? Support your answer.
- d) What is the probability that in picking up a handful of 5 M&M's that all 5 are peanut butter (Hint: The 1<sup>st</sup> is **and** the 2<sup>nd</sup> is **and** the 3<sup>rd</sup> etc. are peanut butter)

4. Using counting theory find the following probabilities.
- a) A combination lock is opened by the correct 3 numbers in sequence with choices of numbers being 0 through 9. Numbers can be repeated. What is the probability of randomly choosing the correct combination to such a lock?
  
  
  
  
  
  
  
  
  
  
  - b) What is the probability of arranging the following letters into the word that I am thinking of? IPFALIUN
  
  
  
  
  
  
  
  
  
  
  - c) To win the lottery the winner must choose 5 numbers from 1 through 36 in any order. Give the probability of winning this lottery.
  
  
  
  
  
  
  
  
  
  
  - d) What is the probability of drawing (in order, without replacement) an ace of diamonds, an ace of spades, an ace of hearts?