First Homework Assignment **due date**

1. Suppose we compiled the following data on the age of a sample of students in a section of econ 2090.

19	40
27	22
21	25
20	

a. Calculate and compare the median and mean of the data. Their difference implies what about the data?
b. Calculate the range of the data.
c. Calculate the variance and standard deviation of the data.
d. Explain what information the standard deviation is providing.

Suppose another section of econ 2090 were surveyed and the ages of the sampled students were recorded below.

27	28
17	25
26	26
25	

e. Calculate the mean, variance and standard deviation of this set of data.
f. Compare the means and standard deviations of the two sampled age distributions, how are they similar? Explain how they differ.
g. Compare the medians. How do they differ? What does their difference imply about the two data sets?

2. Suppose you want to investigate the variation in gasoline prices within the LA area. Suppose you took a sample of prices of gasoline (87 octane) from ten randomly selected LA stations in 2005. You compile the following data:

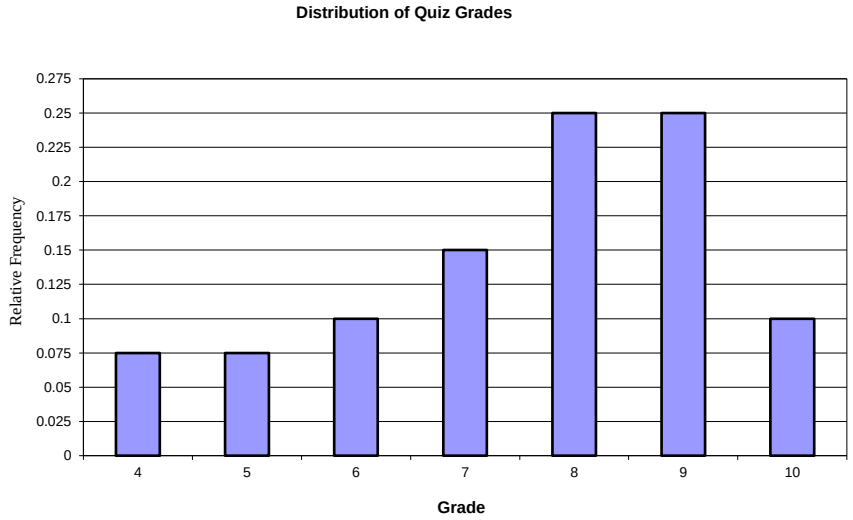
2.40	2.46	2.64
2.05	2.22	1.95
2.40	1.98	2.30
2.46		

You collect a follow-up sample and obtain price data from ten randomly selected stations in 2007. You compile the following data:

3.41	3.36	3.55
3.64	3.48	3.27
3.47	3.52	3.61
3.69		

a. Calculate and compare the mean gas prices for the two years. Are the numbers you are calculating sample means or population means?
b. Calculate and compare the median prices for the two data sets.
c. Which data set appears to be skewed? In which direction is it skewed?
d. Calculate and compare the range in the two data sets. If neither data set were skewed, discuss how the range could possibly be an adequate measure in comparing the variation of the two data sets.
e. Calculate the variance and standard deviation of the two data sets.
f. Interpret the calculated standard deviations. In which year does the evidence suggest gasoline prices exhibited greater variation?
g. Calculate the coefficient of variation. Does the comparison of the coefficients of variation convey the same story as the comparison of standard deviations?
h. Calculate the gasoline price at the 25^{th} and 75^{th} percentile for each of the two years.

3. Suppose the graph below represents the grade distribution for an econ 2090 quiz.



a. What is the median grade?
b. What is the chance a student made a grade of 5 or higher?
c. What is the chance a student made a grade less than a 6?
d. Can we determine from the distribution the *number* of students who made a grade of 5 or higher?
e. Calculate the weighted mean grade.
f. Is the distribution skewed to the left or to the right?

4. Suppose you want to purchase a new smartphone and laptop. You acquire an iphone and an HP laptop. The probability the iphone will turn out to be defective is .04. The probability the laptop will be defective is .06. Assume the probability both items turn out defective is .005.

a. What is the probability only one of the two items will turn out defective?
b. What is the probability neither will be defective?
c. If the iphone turns out defective, what is the probability the laptop will also be defective?
d. If the iphone is not defective, what is the probability the laptop will be defective?
e. Is the chance the laptop turns out defective independent of the iphone being defective?

5. Suppose Cal State LA surveyed all faculty members teaching this semester and compiled the data below.

	Event A	**Event $\bar{A}$**
Event B	.45	.30
Event $\bar{B}$	.15	.10

A={Full Time Faculty}
B={Faculty is below age 40}

a. Describe the population of the problem.
b. Find P(B)
c. Find and interpret P(A∩B)
d. Calculate and interpret P(A∪B)
e. Calculate P(A∪$\bar{B}$)
f. What is the probability a faculty member is full time?
g. Calculate P(A | B)
h. Calculate P(A | $\bar{B}$)
i. Is the probability of being a full time faculty member independent of being below the age of 40?