# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
# DEPARTMENT OF MATHEMATICAL SCIENCES
# DHAHRAN, SAUDI ARABIA

**STAT 211: BUSINESS STATISTICS I**
Semester 041
Mid Term Exam No.1
Tuesday October 19, 2004
7:00 - 8:30 pm

Please **circle** your instructor's name:        Hassen A. Muttlak
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**FORM A**

Name:                                ID#                    Section

| Question No | Full Marks | Marks Obtained |
|:-----------:|:----------:|:--------------:|
| 1 | 11 | |
| 2 | 11 | |
| 3 | 12 | |
| 4 | 5 | |
| 5 | 5 | |
| 6 | 6 | |
| Total | 50 | |

**Q1**. (11 Marks) Answer the following questions by indicating it is **T**rue or **F**alse.

1.  In statistical terms, a population is defined as all the people that live in a particular region of the country.

2.  A phone service provider has 14,000 customers. Recently, the sales department selected a random sample of 400 customer accounts and recorded the number of minutes of long distance time used during the previous month. The data for this variable is considered to be nominal since the values are based on sample data.

3.  A survey conducted by a local real estate agency asked respondents to indicate whether they preferred natural gas, electric, or oil furnaces for heating their home. The data collected for this variable would be of ordinal level.

4.  One of the most effective methods for displaying the trend in the number of traffic accidents over the past ten years is to use a scatter plot showing the number of vehicles on one axis and the number of accidents on the second axis.

5.  A study at State University involved an analysis of students' GPAs and the number of hours that they work at jobs off-campus. An appropriate graph to display the relationship between these two variables might be a scatter diagram.

6.  If after graphing the data for a quantitative variable of interest, you notice that the distribution is highly skewed in the positive direction, the measure of central location that would likely provide the best assessment of the center would be the median.

7.  Data are considered to be right-skewed when the mean lies to the right of the median.

8.  Recently an article in a newspaper stated that 75 percent of the households in the state had incomes of $20,200 or below. Given this input, it is certain that mean household income is less than $20,200.

9.  A recent study involving a sample of 3,000 vehicles in California showed the following statistics related to the number of miles driven per day: $Q1 = 12$  $Q2 = 45$ and $Q3 = 56$. Based on these data, we know that the distribution is skewed.

10. Populations with larger means will also have larger standard deviations since the data will be more spread out for populations with larger means.

11. A Taxi company has two cars. The manager tracks the daily revenue for each car. Over the past 20 days, Car A has averaged $76.00 per night with a standard deviation equal to $11.00. Car B has averaged $200.00 per night with a standard deviation of $18.00. Based on this information, Car B has the greatest relative variation.

**Q2.** (11 Marks) Answer the following questions by choosing the right answer.

1. When an accounting auditor randomly selects 20 accounts from all the accounts to check for accuracy, he has selected:
   a. a personal observation.
   b. a sample from the population.
   c. a census.
   d. a convenience sample.

2. A food warehouse manager plans to conduct a check on damaged packages. The warehouse covers a large area and products are spread out over the entire building. Assuming that no products are more likely to have damaged packages than any other, what statistical sampling method would be used to reduce the time and effort required to do the study?
   a. Convenience sampling
   b. Stratified random sampling
   c. Cluster random sampling
   d. Systematic random sampling

3. General Electric Corporation tracks employee turnover annually. They currently have a data set that contains turnover for the past 20 years. What type of data do they have?
   a. Time series data
   b. Cross-sectional data
   c. Nominal data
   d. Ordinal data

4. The human resources department at a major high tech company recently conducted an employee satisfaction survey of 100 of its 3,000 employees. Data were collected on such variables as age, gender, marital status, current salary, level of overall satisfaction on a scale from 1 to 5, number of years with the company, and job title. Which of the following best describes the overall data set that was generated from the study?
   a. Cross-sectional data
   b. Time series data
   c. Nominal data
   d. Quantitative data

5. The human resources department at a major high tech company recently conducted an employee satisfaction survey of 100 of its 3,000 employees. Data were collected on such variables as age, gender, marital status, current salary, level of overall satisfaction on a scale from 1 to 5, number of years with the company, and job title. Consider only the variable: overall satisfaction. Which of the following best describes the level of data measurement for this variable?
   a. Ratio level
   b. Ordinal level
   c. Nominal level
   d. None of the above.

6. Weekly stock closing prices for IBM would be classified as which of the following?
   a. Cross-sectional data
   b. Time series data
   c. Nominal data
   d. Ordinal data

7. A histogram is used to display which of the following characteristics for a quantitative variable?
   a. The approximate center of the data
   b. The spread in the data
   c. The shape of the distribution
   d. All of the above.

8. A scatter diagram can be used to do which of the following?

   a. Determine the trend in a variable

   b. Analyze the relationship between two variables

   c. Describe the basic distribution for a quantitative variable

   d. Show the percentage of a variable that is associated with each category into which that variable has been divided.

9. A large retail company gives an employment screening test to all prospective employees. Ahmad recently took the test and it was reported back to him that his score placed him at the 80th percentile. Therefore:
   a. 80 people who took the test scored below Franklin.
   b. Ahmad scored as high or higher than 80 percent of the people who took the test.
   c. Ahmad was in the bottom 20 percent of those that have taken the test.
   d. Ahmad's score has a z-score of 80.

10. If a data set has 1,133 sorted values, what value corresponds to the $3^{rd}$ quartile?
    a. The $250^{th}$ value
    b. The $840^{th}$ value
    c. The $760^{th}$ value
    d. None of the above.

11. In the annual report, a major food chain stated that the distribution of daily sales at their Riyadh stores is known to be bell-shaped, and that 95 percent of all daily sales fell between SR19,200 and SR36,400. Based on this information, what were the mean sales?
    a. Around SR20,000
    b. Close to SR30,000
    c. Approximately SR27,800
    d. Can't be determined without more information.

**Q3** (12 Marks) For the following data represent the GPA (X) for 15 students at KFUPM and their seniority (V).

| X | 1.9 | 2.3 | 2.5 | 2.0 | 2.0 | 2.6 | 3.0 | 2.5 | 2.7 | 2.6 | 2.8 | 1.5 | 2.2 | 1.9 | 1.5 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| V | J | F | Se | So | Se | F | J | Se | J | Se | Se | So | Se | Se | So |

a. Construct a bar chart for the variable V.
b. Construct a box plot for the variable X and comment on the shape of the graph.
c. Find the appropriate measure of central tendency for the variable V.

**Q4** (5 Marks)  A store manager tracks the number of customer complaints each week.  The following data reflect a random sample of ten weeks.

| **11** | **19** | **4** | **6** | **8** | **9** | **6** | **4** | **0** | **3** |
|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|

Find the range, variance  and standard deviation of the number of customer complaints.

Show the details of your work.

**Q5** (5 Marks)  The following data reflect the number of customers who test drove new cars each day for a sample of 20 days at a car dealership in Dammam.

**5  7   2  9   4  9  7  10  4  7  5  6  4  0  7  6  3  4  14  6**

Construct the relative frequency histogram and comment on the distribution of the number of cars sold.

**Q6** (6 Marks)  Answer <u>any two</u> of the following for 3 marks each**.**

1. A recent study in the restaurant business determined that the mean tips for male waiters per hour of work are $6.78 with a standard deviation of $1.65.  The mean tips per hour for female waiters are $7.86 with a standard deviation of $2.20.   Based on this information, which waiters have more stable tips? Explain.

2. Give three reasons for drawing a sample rather than examining the whole population of interest.

3. The number of days that homes stay on the market before they sell in Jeddah is bell-shaped with a mean equal to 56 days.  Further, 95 percent of all homes are on the market between 40 and 72 days.  Based on this information, what is the standard deviation for the number of days that houses stay on the market in Jeddah?