



Prince Sultan University
STAT 101
Midterm Examination
Summer Semester 2006/2007, Term 063
Monday, 16th July 2007
Dr. Aiman Mukheimer

Time Allowed: 100 minutes

Name: _____
(First) (Middle) (Last)

ID Number: _____

Serial No.: _____

- You may use CASIO scientific calculator that does not have programming or graphing capabilities.
- You may NOT borrow a calculator from anyone.
- You do NOT get special consideration if you forget your calculator.
- You may Not use notes or any notebook.
- There should be NO talking during the examination.
- If your mobile is seen or heard, your exam will be taken immediately without any warning.
- You must show all your work beside the problem. Be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
- This examination has **12** problems, some with several parts. Make sure that your paper has all these problems

Q1. (10 points) The grades of thirty-three students in STAT 101 were given as follows:

C	A	B	D	F	F	D	F	B	F	C
B	C	B	C	B	F	A	D	A	D	D
B	C	D	C	F	C	D	C	A	D	C

i) What is the experimental unit?

ii) What is the variable being measured?

iii) Construct a pie chart to describe the data.

iv) What proportion of the students, their grades are A or B?

v) What percentage of the students, their grades are not F ?

Q2. (4 points) The ages (in months) at which 30 children were first enrolled in a preschool are listed below.

32	34	41	30	46	35	40	30	46	37
55	39	33	32	32	45	42	41	36	50
42	50	37	39	33	45	38	46	36	31

Use the scientific calculator to find the average, and the variance of 30 children enrolled in a preschool in months.

Q3. (8 points) The amount of Saudi stock market sales for a sample of 6 years is shown below. The data are in billions of Riyals.

10.3 11.2 14.3 13.5 7.8 12.0

i) Find the position of the median and the median.

ii) Find the 60th percentile.

iii) Find the sample standard deviation using the computing formula.

Q4. (6 points) The prices of homes in Riyadh are normally distributed with a mean price of houses 500000 SR, and the standard deviation 100000 SR. Find the price range for which at least 95% of houses will sell.(Find the minimum and the maximum values where 95% of houses will sell).

Q5. (15 points) Suppose you are told that the mean and variance of a sample of $n=500$ observations were 50 and 100 respectively. You know nothing else about the shape of the distribution for these data.

a. What can you say about the proportion of observations between 34 and 66?

b. What can you say about the proportion of observations are between 20 and 80?

c. What can you say about the proportion of observations are grater than 66?

d. What can you say about the proportion of observations are smaller than 35?

e. If we assume the distribution is in fact mound-shaped. What percentage of observations are greater than 70?

Q6. (4 points) If the 90th and 91st observations in a set of 100 data values are 158 and 167, respectively, then the 90th percentile value is:

Q7. (17 points) a. Find the Range, mean, variance, median, the lower and upper quartiles and the interquartile range for the following data: 4, 0, 5, 3, 6, 2, 5, 9, 5, 3.

b. Compare the range and the standard deviation, the range is approximately how many standard deviations?

c. Use the range approximation to estimate the value of s , the sample standard deviation.

d. Calculate the z-score for the smallest and largest observations in the set. **Is either of these observations unusually small or large?**

e. Construct a box plot for the data. **Are there any outliers?**

Q8. (6 points) A candy store sells candy in bulk. The manager was interested in examining how much candy people buy on a visit to the store. The following data represents the amount of candy (measured in ounces) purchased by 25 customers:

12.1 13.3 12.5 12.7 15.3 16.1 16.5 14.4 15.1 14.7 12.5 14.4 14.8
16.2 15.6 14.9 13.5 12.7 16.2 16.5 16.7 15.4 13.7 14.3 19.8

a. Construct a stem and leaf plot to describe the data.

c. Do any of the observations appear to be outliers? If so, which one or ones?

Q9. (6 points) The following data represents the number of pages of notes per lecture taken by a student in a beginning statistics course.

1 5 2 6 2 3 3 4 4 4 5 6 6 5 6 4 5 6 5 5 5 5 5 6 6 6 6 6 6

a. Construct a dot plot to describe the data.

b. Would you describe whether the distribution of the data is symmetric, skewed to the right or skewed to the left?

Q10. (4 points) The following data represent the number of small cracks per bar for a sample of eight steel bars: 4 6 10 1 3 1 25 8

a. Find the mode and the average number of small cracks per bar.

b. Find the standard deviation for the number of small cracks per bar.

Q11. (4 points) Twenty-eight applicants interested in working for the Food Stamp program took an examination designed to measure their aptitude for social work. A stem-and-leaf plot of the 28 scores appears below, where the first column is the stem value, and the second column digits are the leaves.

a. Can the Empirical Rule be applied to this data set? **Why?**

Stems	Leaves
4	6
5	9
6	3688
7	026799
8	145667788
9	1234788

b. Use the range approximation to determine an approximate value for the standard deviation.

Q12. (16 points) When the price of gasoline gets high, consumers become very concerned about the gas mileage obtained by their cars. One consumer was interested in the relationship between car engine size (number of cylinders) and gas mileage (miles/gallon). The consumer took a random sample of 7 cars and recorded the following information:

$$n = 7, \sum x_i = 24.7, \sum y_i = 177, \sum x_i y_i = 600.7, s_x = 1.2406, \text{ and } s_y = 4.3861$$

a. Would you expect the correlation between engine size and gas mileage to be positive or negative? **Explain why?**

b. Find the correlation between engine size and gas mileage.

c. Would you consider the correlation to be weak or strong? **Why?**

d. Find the best fitting line relating car engine size and gas mileage.

e. What would you predict the gas mileage to be for a car with 6-cylinder engine size?