Prince Sultan University

Deanship of Educational Services
Department of Mathematics
and General Sciences

COURSE DETAILS:

Statistics and Probability Theory	STAT 101	Major 1
Semester:	Spring Semester --Term 182	
Date:	February 18, 2019	
Time Allowed:	**90 minutes**	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section/Time	
Instructor's Name:	Dr. Bahaa Abdalla Dr. Eric Benson Dr. Mohammed Kaouache

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and 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.

GRADING:

	Page 2	Page 3	Page 4	Page 5	Page 6	Page 7	Total
Questions	**12**	**10**	**18**	**15**	**15**	**10**	**80**
Marks							

12 points

1. Given a set of data that is approximately bell shape with a mean of 200 and a standard deviation of 20, use the empirical rule to find the following percentages.
    a. Find the percentage of data that lies between 220 and 260. **(3 points)**

    b. Find the percentage of data that lies between 140 and 220. **(3 points)**

    c. Find the percentage of data that lie less than 240. **(3 points)**

    d. What percentage of data lies between 180 and 240? **(3 points)**

10 points

2. A data set consists of 16 measurements. The following information is given. $\sum x_i = 1043$ and $\sum x_i^2 = 77927$. Calculate the coefficient of variation.

18 points

3. The data is the examination results for 500 students, distributed into cells according to the results in both subjects. The subjects are **Accounting** and **Mathematics** results are graded in three levels; Merit, Pass and Fail.

		Mathematics			
		Merit	Pass	Fail	
Accounting	Merit	120	10	0	130
	Pass	100	190	30	320
	Fail	20	10	20	50
		240	210	50	500

a. When it is known that the student has a Pass grade in accounting calculate the probability that the student was awarded a Merit in mathematics. **(4 points)**

b. What is the probability of a student getting a Merit in mathematics or a Pass in Mathematics? **(4 points)**

c. When it is known that the student has Fail in mathematics calculate the probability that the student was awarded a Merit in accounting. **(5 points)**

d. What is the probability of being awarded a pass in mathematics or awarded a pass in accounting? **(5 points)**

15 points

4. An automobile manufacturer has three factories A, B, and C. they produce 50%, 30%, and 20%, respectively, of a specific model of car. Thirty percent of the cars produced in factory A are white, 40% of those produced in factory B are white, and 25% in factory C are white.
   a. If an automobile produced by the company is selected at random, find the probability that it is white. **(5 points)**

   b. If an automobile selected at random is not white, find the probability that it was produced by company B. **(5 points)**

   c. If an automobile selected at random is white, find the probability that it was produced by company A. **(5 points)**

15 points

5. **Old Faithful** The data below are 30 waiting times between eruptions of the Old Faithful geyser in Yellowstone National Park

51 52 52 53 54 55 56 58 59 61 69 71 71 72 75 76 77 77 78 78 79 80 81 82 85 86 87 88 89 93

The sample mean and sample standard deviation are 71.5 minutes and 13.10107 minutes respectively.

a. What proportion of the measurements lie within two standard deviations of the mean? Within three standard deviations of the mean? Do these proportions agree with the proportions given in Tchebysheff's Theorem? **(5 points)**

b. Find the median of the data set. What is the shape of the distribution of the data? Give reasons for your answer. **(5 points)**

c. Sketch a boxplot of this data. Are there any outliers? **(5 points)**

10 points

6. In a distribution of 256 values with a mean of 90, at least 240 fall within the interval 76 – 104. What is the variance?