

Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences



COURSE DETAILS:

Statistics and Probability Theory		STAT 101	Major 2
Semester:	Fall Semester --Term 181		
Date:	November 12, 2018		
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	15	15	14	12	12	12	80
Marks							

1. Let X be a normal random variable with $\mu = -25$ and $\sigma = 10$. Find the values of x_0 corresponding to the following probabilities: **Draw pictures**

a. $\Pr(X \leq x_0) = 0.1251$ (5 points)

b. $\Pr(X \geq x_0) = 0.8340$ (5 points)

c. $\Pr(X > x_0) = 0.3859$ (5 points)

2. A survey reported that 32% of drivers in one Asian country use their mobile phones while driving. A sample of 30 drivers was selected at random.
- Find the probability that at least 15 drivers use their mobile phones while driving. **(6 points)**
 - Find the average number and the standard deviation of number of drivers in the sample who use their mobile phones while driving. **(5 points)**
 - Find the percentage of drivers who use their mobile phones while driving within two standard deviation of the mean ($\bar{x} \pm 2s$). **(4 points)**

3. Suppose that the number of calories in a salad on the lunch menu is normally distributed with mean 200 and standard deviation 5.
- Find the probability that the salad you select will contain between 190 and 202 calories. **(5 points)**
 - Find the 90th percentile of the number of calories in the salad. **(5 points)**
 - If 20% of the salads are considered suitable for a diet because of their low calories, find the number of calories that is suitable for the diet. **(4 points)**

4. Customers arrive at a checkout counter in a department store according to a Poisson distribution at an average of seven per hour. During a given hour, what are the probabilities that
- no more than three customers arrive? **(3 points)**
 - at least two customers arrive? **(3 points)**
 - Find the mean and standard deviation of the number of arrival in an hour. **(3 points)**
 - Find the percentage of arrivals within $\bar{x} \pm 2s$ (that is within two standard deviations of the mean) **(3 points)**

5. Suppose a random variable, x , has a uniform distribution with $a = 5$ and $b = 20$.
- Calculate $P(7 < x < 13)$ (4 points)
 - Compute the mean and the standard deviation of the random variable. (3 points)
 - Find the interquartile range of the random variable. (5 points)

6. **Defective Electronics** In a shipment of 24 Microsoft Surface Pro there are actually 6 Surface Pro that are defective, if 3 Surface Pro are checked for defects.
- a. Find the probability of no or three defects. **(6 points)**
- b. Find the probability of at least two defective. **(6 points)**