KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 142

STAT 211 BUSINESS STATISTICS I

Please circle your instructor name:

W. Al- Sabah M. Saleh

Name: _____ ID #:_____Section #:____

Important Note:

- Show all your work including formulas, intermediate steps and final answer

Question No	Full Marks	Marks Obtained
1	4	
2	4	
3	6	
4	5	
5	6	
Total	25	

Q1: A contractor bids on jobs where he can make $3000 profit. The probabilities of getting one, two, three, or four jobs per month are shown.

Number of jobs X	1	2	3	4
Probability P(x)	0.2	0.3	0.4	0.1

a. Find the contractor's expected profit per month. (2 pts)

b. Find the variance of profit. (2 pts)

Q2: Thirty percent of all customers who enter a store will make a purchase.

I. Suppose that six customers enter the store and that these customers make independent purchase decisions.

a. Find the probability that at least one customer will make a purchase. (2 pts)

b. What is the expected number of the customers who will make purchase? (1 pt)

II. Suppose in one day 30 customers enter the store, in a sample of size 6 customers, what is probability that exactly 2 customers make a purchase? (1 pt)

Q3: Ahmed figures that the total number of miles that a car can be driven before it would need to be junked is an exponential random variable with mean 20,000 miles.

a. If Ahmed purchases a new car, what is the probability that he would get at least 20,000 miles out of it? (2 pts)

b. Abdullah has a used car that he claims has been driven only 10,000 miles. If Ahmed purchases this car, what is the probability that he would get at least 20,000 additional miles out of it? (3 pts)

c. Compare the answers in a and b above. (1 pt)

Q4: The average weight of an airline passenger's suitcase is 45 pounds with standard deviation of 2 pounds. Assume the variable is normally distributed.

a. What percentage of suitcases have weight between 40 and 47 pounds? (3 pts)

b. If 15% of the suitcase are over weight, find the maximum weight allowed by the airline. (2 pts)

Q5: A gasoline station is supplied with gas once a week. If its weekly volume of sales in thousands of gallons is a random variable with probability density function

$$f(x) = 5x^4, \quad 0 < x < 1$$

Thus, the probability the sales are between s and t in 1,000 gallons is $\int_s^t f(x)\, \boldsymbol{dx}$

a. What is the probability that the sales is between 5 hundred and 6 hundred gallons? (2 pts)

b. How much gasoline does the station need to buy from its supplier so that the probability of running out of gasoline in any given week is 0.01? (2 pts)

c. If the station makes $2 per gallon, what is the expected volume of sales in dollars? (2 pts)

Some Useful Formulas

- $\boldsymbol{\mu = E(X) = \sum_{i=1}^{n} x_i\, P(X = x_i)}$, $\boldsymbol{or}$ $\boldsymbol{\mu = E(X) = \int x\, f(x)\, dx}$
- $\boldsymbol{\sigma^2 = E(X^2) - E(X)^2}$,
- $\boldsymbol{P(X = x) = C_x^n\, \pi^x\, (1-\pi)^{n-x}}$, $\boldsymbol{x = 0, 1, \dots, n}$, $\boldsymbol{\mu = n\pi}$, $\boldsymbol{\sigma = \sqrt{n\pi(1-\pi)}}$
- $\boldsymbol{P(X = x) = \frac{(\lambda t)^x\, e^{-\lambda t}}{x!}}$, $\boldsymbol{\mu = \lambda t}$, $\boldsymbol{\sigma = \sqrt{\lambda t}}$
- $\boldsymbol{P(X = x) = \frac{C_x^X\, C_{n-x}^{N-X}}{C_n^N}}$, $\boldsymbol{\mu = \frac{nX}{N}}$, $\boldsymbol{\sigma = \sqrt{\frac{nX(N-X)}{N^2}}\sqrt{\frac{N-n}{N-1}}}$
- $\boldsymbol{f(x) = \frac{1}{b-a}}$, $\boldsymbol{a < x < b}$, $\boldsymbol{\mu = \frac{a+b}{2}}$, $\boldsymbol{\sigma = \sqrt{\frac{(b-a)^2}{12}}}$
- $\boldsymbol{f(x) = \lambda e^{-\lambda x}}$, $\boldsymbol{x > 0\ then\ \ P(X < a) = 1 - e^{-a\lambda}}$, $\boldsymbol{\mu = \sigma = \frac{1}{\lambda}}$