KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 141

STAT 211 BUSINESS STATISTICS I

Monday November 3, 2014

Name: _____ ID #:_____

Important Note:

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

Question No	Full Marks	Marks Obtained
1	3	
2	5	
3	10	
4	12	
5	6	
6	14	
Total	50	

Q1: (1 *point each*) Classify each statements as an example of classical probability, empirical probability, or subjective probability.

a. The probability that a student will get a C or better in a statistics course is about 70%.

b. The probability of winning at a Chuck – a- Luck game is $\frac{5}{36}$.

c. The probability that interest rates rise in the next six months is 50% .

Q2: a box contains a $1 bill, a $5 bill, a $10 bill and $20 bill, A bill is selected and it is not replaced, then a second bill is selected at random. Draw a tree diagram and determine the sample space. $(5pts)$

Q3: the number of refrigerators sold per day at a local appliance is shown in the table a long with the corresponding probabilities.

Number of refrigerators sold	0	1	2	3	4
Probability	0.1	0.2	0.3	0.2	0.2

a. Find $P(X < 2) =$ $(2pts)$

b. Find the expected number of refrigerators sold per day. $(3pts)$

c. Find the standard deviation of refrigerators sold per day. $(5pts)$

Q4: The probability that a student owns a car is 0.65, and the probability that a student owns a computer is 0.82, and the probability that a student owns both is 0.55. If a student selected randomly, find the probability that

a. He owns neither a car nor a computer. $(3pts)$

b. He owns only one of the two. $(3pts)$

c. If the student owns a car, what is the probability he also owns a computer. $(2pts)$

d. Let the event A: the student owns a car, the event B: the student owns a computer

   i. Are the two events mutually exclusive? Explain $(2pts)$

   ii. Are the two events independent? Explain $(2pts)$

Q5: Assume that flaws per sheet of glass can be represented by a Poisson distribution, with an average of 0.7 flaws per sheet.

a. What is the probability that randomly selected two sheets of glass have more than one flaw? (4*pts*)

b. What is the mean number of flaws per 12 sheets? (2*pts*)

Q6: Thirty percent of all households have an insurance policy.

a. If the household were checked one by one, what is the probability that the first household, that has an insurance policy, is the fourth? (2*pts*)

b. If you select 20 houses at random, what is the probability that at least three of them have an insurance policy? (5*pts*)

c. Given that in a randomly selected block there are 15 houses, what is the probability that 6 houses would have an insurance policy, in a sample of 8 houses randomly selected from that block? (3*pts*)

d. What is the expected number of houses that would have an insurance policy? (2*pts*)

Some Useful Formulas

- $P(A \text{ or } B) = P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- $P(A \cap B') = P(A) - P(A \cap B)$
- $P(A|B) = \frac{P(A \cap B)}{P(B)}$, $P(B) > 0$
- $P(A \cap B) = P(A) \times P(B \mid A) = P(B) \times P(A|B)$
- $\boldsymbol{P(X = x) = C_x^n\, p^x\, (1-p)^{n-x},\quad x = 0, 1, \ldots, n,\qquad \mu = np,\quad \sigma = \sqrt{np(1-p)}}$
- $P(x) = \frac{(\lambda t)^x e^{-\lambda t}}{x!}$, $\mu = \lambda t$, $\sigma = \sqrt{\lambda t}$
- $P(x) = \frac{C_{n-x}^{N-X} C_x^X}{C_n^N} = \frac{\binom{N-A}{n-x}\binom{A}{x}}{\binom{N}{n}}$
- $\boldsymbol{f(x) = e^{-\lambda x},\ x > 0\ then\ \ P(X < a) = 1 - e^{-a\lambda} \qquad \mu = \sigma = \frac{1}{\lambda}}$
- $\boldsymbol{\bar{p} = \frac{x}{n}}$
- $\boldsymbol{Z = \frac{x-\mu}{\sigma}}$ **or** $\boldsymbol{Z = \frac{\bar{x}-\mu_{\bar{x}}}{\sigma_{\bar{x}}}}$ **or** $\boldsymbol{Z = \frac{\bar{p}-\mu_{\bar{p}}}{\sigma_{\bar{p}}}}$
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