KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Term 131

STAT 213 Statistics for Actuaries

Second Major Exam Wednesday November 20, 2013

Name: _____ ID #: _____

☺Important Note:

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

Question No	Full Marks	Marks Obtained
1	4	
2	10	
3	3	
4	12	
5	11	
Total	40	

1) A survey of Amazon.com shoppers reveals the following probability distribution of the number of books purchased per visit:

Number of Books	0	1	2	3	4
Probability	0.35	0.25	0.2	0.1	0.1

a) What is the probability that a visitor will purchase more than 2 books? *(1 pt.)*

b) What is the probability that a visitor will purchase 5 books? *(1 pt.)*

c) What is the average number of books purchased per visit? *(2 pts.)*

2) STC customer callers encounter busy signals 12% of the time.

a) One customer called 10 times, what is the probability that he got a busy signal 3 times? *(3 pts.)*

b) Another customer called 45 times; approximate the probability that he got a busy signal at least 10 times? Justify your answer. *(5 pts.)*

c) A third customer decides to call until an operator answers. What is the probability he reaches an operator for the first time on the 4^{th} try? *(2 pts.)*

3) From an inventory of 15 cars available at the car dealer, 5 are sports cars. Out of 4 cars purchased what is the probability that 2 are sports cars? *(3 pts.)*

4) The amount of time devoted to studying statistics each week by students who achieve a grade of A in the course is normally distributed with mean of 7.5 hours and a standard deviation of 2.1hours.

   a) Find the probability that an A-student spends between 7 and 9 hours studying. *(5 pts.)*

   b) What is the amount of time below which only 5% of all A-students spend studying? *(3 pts.)*

   c) What is the probability that the average time of 9 A-students exceeds 8.5 hours? *(4 pts.)*

5) It is known that the amount of time needed to change the oil on a car is normally distributed with a standard deviation of 5 minutes. A random sample of 10 oil changes gave the following times:

11 10 16 15 18 12 25 20 18 24

a) Compute a 99% confidence interval estimate for the mean time to change oil. *(4 pts.)*

b) Interpret this interval. *(1 pt.)*

c) If you want to compute a 99% confidence interval with an error of estimation of at most 1 minute, how large a sample do you need? *(2 pts.)*

d) Compute a 95% confidence interval for the proportion of oil changes that take less than 15 minutes. *(4 pts.)*