STAT370/Section #12745/Quiz 2

Nov. 22, 2011

Student's Name (Please print) _____

SSN(Last 4 digits only) _____

(Total: 100 points)	There are 5 questions in this quiz. Solutions for each question must exhibit a clear, complete line of reasoning in order to receive full credit. Show all your work. An answer by itself is worth 0 points.

1 (20 points). Of nine candidates seeking three positions at a counseling center, six have degrees in social science and three do not. If three candidates are selected at random, find the probability distribution of X, the number having socail science degrees among the selected persons.

2 ($20(= 7 \times 2 + 6)$ points). The time for an emergency medical squad to arrive at the sports center at the edge of town is distributed as a normal variable with mean $\nu = 15$ minutes and standard deviation $\sigma = 4$ minutes. Determine the probability that the time to arrive is:

(i) More than 25 minutes

(ii) Between 10 and 30 minutes

(iii) Less than 5 minutes

3 (20 ($= 2 \times 10$) points). From the set of numbers $\{1, 3, 5\}$, a random sample of size 2 will be selected with replacement.

(i) List all possible samples and evaluate $\bar{x}$ for each.

(ii) Determine the sample distribution of $\bar{X}$.

4 (20(= 2 × 10) points). A population has distribution

Value	Probability
0	0.2
2	0.3
4	0.5

Let X_1 and X_2 be independent and each have the same distribution as the population.

(i) Determine the missing elements in the table for the sampling distribution of $\bar{X} = \frac{X_1+X_2}{2}$.

$\bar{x}$	Probability
0	0.04
1	
2	
3	
4	

$P(\bar{X} = 1) =$

$=$

$=$

$P(\bar{X} = 2) =$

$=$

$=$

$P(\bar{X} = 3) =$

$=$

$=$

$P(\bar{X} = 4) =$

$=$

$=$

(ii) Find the expected value of $\bar{X}$.

5 (20 (=2×10) points). A market researcher wants to perform a test with the intent of establishing that his company's medium pump bottle of soap has a mean life greater than 45 days. The sample size is 81 and he knows that the population standard deviation is 4 days.

(i) If you set the rejection region to be $R : \bar{X} \geq 45.73$, what is the level of significance of your test?

(ii) Find the numerical value of c so that the test $R : \bar{X} \geq c$ has a 3% level of significance.