SHOW WORK TO GET FULL CREDIT

Fall 2014   **October 1, 2014**
MATH-333 (Common Exam. #1)   **NJIT**

Q. # 1	#2	#3	#4	#5	Total
20	20	20	20	20	100

Name (PRINT) _____   **Section # _____**
                Last   **First**
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This problem has three independent parts a), b), and c)
Problem 1) a) In a chemical plant, 24 holding tanks are used for final product storage. Suppose that six of the tanks contain high viscosity material. Four tanks are selected at random and without replacement. What is the probability that exactly one tank in the sample contains high-viscosity material? (6 points)

b) Consider the design of a communication system. How many three digit phone prefixes are possible that do not start with 0 or 1, but contain 0 or 1 as the middle digit? (6 points)

c) The probability is 1% that an electrical connector that is kept dry fails during the warranty period of a portable computer. If the connector is ever wet, the probability of a failure during the warranty period is 5%. If 90% of the connectors are kept dry and 10% are wet, what proportion of connectors fail during the warranty period? (8 points)

This problem has 3 independent parts a), b), and c)
Problem 2)
a) A manufacturer of front light for automobiles tests lamps under a high humidity, high temperature environment. Intensity and Useful Life are the responses of interest. The following table shows the performance of 130 lamps:

		Useful Life		
		Satisfactory (U)	Unsatisfactory (U')	Total
Intensity	Satisfactory (I)	117	3	
	Unsatisfactory (I')	8		
	Total			130

Fill in the missing values in the table. Find the probability that a randomly selected lamp will yield satisfactory intensity given that it has unsatisfactory useful life. (6 points)

b) The probability that a customer's order is not shipped on time is 0.05. A particular customer places three orders, and the orders are placed far enough apart in time that they can be considered to be independent events. What is the probability that all are shipped on time? (4 points)

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c) The following shows the results of a 180 person customer satisfaction survey of users of two major cellular service providers.

		Customer Satisfaction		
		Yes (S)	No (S')	Totals
Cellular Provider	Verizon (V)	60	20	80
	T-Mobile (T)	50	50	100
	Totals	110	70	180

i) A random person from this survey is selected. Find the probability that the person is either a satisfied customer or a T-Mobile user. (6 points)

ii) Find the probability that the person is a satisfied Verizon customer. (4 points)

This problem has 2 independent parts a) and b)
Problem 3)
  a) A researcher receives 106 containers of oxygen. Of those containers, twenty of them have oxygen that is not ionized and the rest are ionized. Two samples are randomly selected, without replacement, from the lot.
  i) What is the probability that the second one selected is not ionized given that the first one was ionized? (7 points)

ii) What is the probability that both are not ionized? (7 points)

b) Box plot for quiz scores from a statistics course is shown below:

Boxplot of Quiz Scores
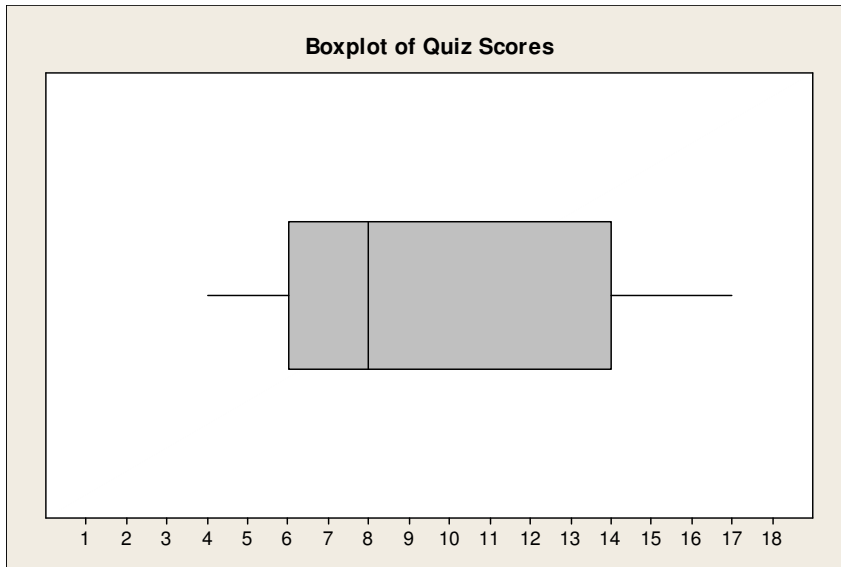
Which of the following statements are true? (6 points)

I. The distribution is skewed left
II. The interquartile range is 8
III. The median is 11

Circle those that apply

(A) I only

(B) II only

(C) III only

(D) I and III

(E) II and III

(F) I and II

Problem 4) A company that manufactures video cameras produces a basic model, intermediate model, and deluxe model. Over the past year, 40% of the cameras sold have been the basic model, 35% have been intermediate model, and 25% have been deluxe model. Of those buying the basic model, 95% purchased an extended warranty, of those buying the intermediate model 60% purchased an extended warranty, and of those buying the deluxe model 10% purchased an extended warranty.

a) What is the probability that a randomly selected purchaser has an extended Warranty? (6 points)

b) If you learn that a randomly selected purchaser has an extended Warranty, what is the probability that this person purchased a deluxe model? (7 points)

c) If you learn that a randomly selected purchaser does not have an extended Warranty, what is the probability that this person purchased a basic model? (7 points)

This problem has 2 independent parts a) and b)
Problem 5)

a) The scores of 10 students on a statistics quiz are listed as follows: 1, 2, 7, 12, 10, 5, 6, 7, 8, 9. Obtain the sample variance10 points)

b) A manufacturer of coil spring is interested in implementing a quality control system to monitor his production process. As part of this quality system, it is decided to record the number of nonconforming springs in each production batch. During 39 days of production, 39 batches of data were collected and the number of non-conforming springs are shown in the stem and leaf plot below:

```
Stem-and-leaf of Springs  N  = 39
Leaf Unit = 1.0                      Stem: Tens digits    Leaf: Ones digits


  1    0│ 1
  3    0│ 33
  8    0│ 44555
 18    0│ 6666777777
(7)    0│ 8888999
 14    1│ 111
 11    1│ 22233
  6    1│ 45
  4    1│ 77
  2    1│ 89
```

Obtain the range, quartiles, and the interquartile range (10 points)

Extra Space (ANY "Rough Work" must be crossed out)
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