Vietnam National University – HCM
International University

Academic Year 2013 – 2014, Semester 01
Course: Statistics for Business

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## MID-TERM EXAMINATION

| SOLUTION FOR SAMPLE TEST 03 | Duration: **120** Minutes |
|---|---|
| **Student ID:**<br><br>**Name:** | Date: |

**INSTRUCTIONS:**

1. This is an open book examination. Answer multiple choice questions in exam question paper, answer writing in answer sheets provided.
2. Calculator and dictionary are allowed.
3. Discussion and material transfer are strictly prohibited.

**PART I: Multiple Choice Questions** **(40%)**

**Use the following problem to answer next 2 questions:**

A manager wants to establish a project group of 5 members. Members of the group are selected from 5 women and 7 men.

1. How many ways to select a group consists of 2 women and 3 men?
   *Answer: 250.*

2. What is the probability that the group would consist of 3 women and 2 men?
   *Answer: 0.2652*

**Use the following to answer next 3 questions:**

The test scores for 15 students in a given class are as follow:

| 65 | 39 | 73 | 45 | 78 | 77 | 83 | 93 | 71 | 60 | 69 | 56 |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 52 | 79 | 88 |    |    |    |    |    |    |    |    |    |

3. The mean value of the test score is: **68.5333.**

4. Verify Chebyshev's theorem using the above data:
   *There would be all (100%) observations fall in the interval $\bar{x} \pm 2s = 68.5333 \pm 2 \times 15.6427 = [37.2479, 99.8188]$. Hence, Rule 1 of Chebyshev's Theorem is satisfied.*

5. Briefly verify Empirical rule using the above data:
   *Since the distribution is not mound-shaped, the empirical rule cannot be applied.*

**Use the following data for the next 3 questions:**

Suppose a study of strong recommendation letter and receiving the scholarship offer produced the following data:

|  | Receiving the scholarship | No receiving the scholarship |
|---|---|---|
| Strong recommendation letter | 233 | 67 |
| Not strong recommendation letter | 89 | 251 |

6. What is the probability that a selected candidate does not have a strong recommendation letter and does not receive the scholarship?
   a) 0.724
   b) 0.582
   c) 0.58
   *d) 0.392*
   e) None of the above, specify_____

7. What is the probability that a selected candidate has a strong recommendation letter given that he is does not receive the scholarship?
   a) 0.414
   *b) 0.211*
   c) 0.115
   d) 0.276
   e) None of the above, specify_____

8. Consider candidates who have the strong recommendation letters, what is the probability that a selected candidate does not receive the scholarship?
   a) 0.2739
   *b) 0.2233*
   c) 0.3576
   d) 0.7178
   e) None of the above, specify_____

**Use the following data to answer the next 4 questions:**

The sample data is given:

| 25 | 29 | 29 | 33 | 36 | 38 | 40 | 43 | 43 | 43 |
|---|---|---|---|---|---|---|---|---|---|
| 49 | 53 | 57 | 60 | 68 | 72 | 77 | 86 | 90 | 99 |

9. Median of the above data is:
   a) 67
   *b) 46*
   c) 54
   d) 78
   e) None of the above

10. Treat the above data as a sample, its variance is:
    a) 506.562
    b) 488.857
    *c) 480.579*
    d) 561.761
    e) None of the above, specify _____

11. The 65$^{th}$ percentile is:
   a)  52.1
   b)  69.3
   c)  61.4
   d)  55.75
   e)  *None of the above, specify 58.95*

12. The IQR (Inter-Quartile Range) is:
   a)  42.75
   b)  75.6
   c)  57.6
   d)  82.4
   e)  *None of the above, specify 34.5*

**Use the following data to answer the next 2 questions:**

A company has a new project under way and selects 8 executives for a transfer from their current jobs. A report had suggested that 70% of all executives in this company would like this new job.

13. What is the probability that at least 5 of these 8 selected like their new job?
   a)  0.456
   b)  0.251
   c)  0.578
   d)  *0.806*
   e)  None of the above

14. What is the probability that exactly 5 of the 8 selected like their new job?
   a)  0.421
   b)  0.736
   c)  *0.254*
   d)  0.896
   e)  None of the above

**Use the following data for the next 3 questions:**

The following table gives the probability distribution of the number of cars sold per week at a particular car salon.

| Number of cars | Probability |
|----------------|-------------|
| 0 | 0.04 |
| 1 | 0.10 |
| 2 | 0.18 |
| 3 | 0.22 |
| 4 | 0.25 |
| 5 | 0.15 |
| 6 | 0.04 |
| 7 | 0.02 |

15. The expected value of the number of cars sold per week is:
    a) 4.15
    *b) 3.25*
    c) 2.95
    d) 3.10
    e) None of the above, specify_____

16. The standard deviation of the number of cars sold per week is:
    a) 1.153
    b) 2.164
    c) 1.832
    *d) 1.552*
    e) None of the above, specify_____

17. Find the probability that the number of cars sold per week is at least 3 and less than 6:
    a) 0.35
    *b) 0.62*
    c) 0.56
    d) 0.40
    e) None of the above, specify_____

18. The time, in hours, that a machine may work without breaking down is a normally distributed random variable with mean 350 and standard deviation 30. The probability that the machine will work for at least 380 hours without breaking down is:
    a) 0.194
    b) 0.280
    *c) 0.159*
    d) 0.096
    e) None of the above, specify_____

**Use the following data for the next 2 questions:**

Du Mien, a well-known coffee shop, buys coffee from only two sources. Because Supplier A's defect rate (6%) is twice that of Supplier B, Du Mien buys 70% of its coffee from Supplier B.

19. What is the probability that a randomly selected coffee batch is a good one?
    a) 0.92
    b) 0.588
    *c) 0.961*
    d) 0.948
    e) None of the above, specify_____

20. Given that a randomly selected coffee batch is good one. What is the probability that this coffee batch is from supplier A?
    *a) 0.293*
    b) 0.518
    c) 0.961
    d) 0.742
    e) None of the above, specify_____

**PART II : Writing**                                                   **(60 %)**

**Question 1:**     (15pts)
Given a set of data:

| 104 | 115 | 124 | 130 | 138 | 146 | 153 | 166 | 172 | 179 | 184 | 195 | 207 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 222 | 251 | 345 |     |     |     |     |     |     |     |     |     |

a. What are the mean and the standard deviation of this sample? ***Answer:*** $\bar{x} = 176.9375$; $s = 60.2201$

b. Find the 1st, 2nd, 3rd quartiles and 70th percentile. ***Answer: The $1^{st}$ quartile $(132)$; The $2^{nd}$ quartile $(169)$; The $3^{rd}$ quartile $(204)$; The $70^{th}$ percentile $(193.9)$.***

c. Construct the box plot for this data set. Interpret your findings.

**Question 2:**     (10pts)
A brokerage survey reports that 30% of individual investors have used a discount broker, that is, one which does not charge full commission. In a random sample of 9 individuals, what is the probability that

    a. exactly two of sampled individuals have used a discount broker**. *Answer: 0.2668***
    b. not more than three have used a discount broker. ***Answer: 0.7297***
    c. at least three of them have used a discount broker. ***Answer: 0.5372***

**Question 3:**     (10pts)
Suppose that the time it takes for an IU student to go to university by bus follows a normal distribution with mean 60 minutes and standard deviation 15 minutes. A random student is selected.

    a. What is the probability that the student's traveling time is less than 45 minutes? ***Answer: 0.1587***
    b. 90% is the probability that the student's traveling time is between (mean – A) and (mean + A) minutes. Determine the value A (minutes). ***Answer: 24.6750***

**Question 4:**     (15pts)
You ask your neighbor to water a sickly plant while you are on vacation. Without water it will die with probability 0.8; with water it will die with probability 0.15. You are 90 percent certain that your neighbor will remember to water the plant.

    a. What is the probability that the plant will be alive when you return? ***Answer: 0.7850.***
    b. If it is dead, what is the probability your neighbor forgot to water it? ***Answer: 0.3721.***

**Question 5:**     (10pts)
A high school studied about the interest of students in 2 subjects Mathematics and English. The result showed that 35% of students like Math, 40% of students like English, and 10% like both Math and English.

    a. What percentage of students like Math or English? ***Answer: 0.65***
    b. What percentage of students like neither Math nor English? ***Answer: 0.90.***

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