يجيب الطالب السؤال الأول في ورقة الاسئلة و ترفق بكرسة الاجابة

مسموح بصفحتين جداول و ٤ صفحات قوانين

Fayoum University
Faculty of Engineering
Date: Jan., 23, 2016, Time: 3 Hrs

Mathematics and Statistics (Full mark=75)
Final Term Exam. 1st year Arch. Dept.
Examiner: Dr Karem Mahmoud Ewis

**Q1** Choose the correct answer as this Figure (30 M)

1. Let $P(A_1)=P(A_2)....=P(A_n)=2P(A)$ are mutually exclusive events. What is equivalent to $P(\bigcup_{i=1}^{n} A_i)$?

(A) 0 (B) $2nP(A)$ (C) $2\prod_{i=1}^{n} P(A_i)$ (D) $nA$

2. Find standard deviation of geometric distribution of P(success)=0.64

(A) 1/2 (B) 15/16 (C) 16/15 (D) 0.87890625

3. Let $p(x)$ is a discrete (pf). What is formula represent mean of X?

(A) $\sum_{x=0}^{n} x^2 p(x)$ (B) $\sum x\,p(x)$ (C) $\sum_{x=0}^{n} x\,p(x)$ (D) 0

4. The normal *pdf* of $\mu = 0$ is reduced to ..... distribution.

(A) even (B) binomial (C) normal (D) standard normal

5. Find F(7.5) of an exponential distribution with $\lambda$ =0.2 and four trials

(A) 0.777 (B) -0.777 (C) 7.77 (D) 0.045

6. If the confidence interval of $\mu$ is $(\bar{x} \mp 2z_{0.05})$, $E$=.....

(A) 1.645 (B) 3.29 (C) 1.96 (D) 1.28

7. In the right -tailed hypothesis test, we accept $H_A$. If .....

(A) $\bar{x} > C$ (B) $\bar{x} < C$ (C) $\bar{x} \le C$ (D) $\bar{x} \ge C$

8. Find $E(X^2 - \mu X)$ , in the gamma distribution.

(A) 0 (B) $\mu$ (C) $\sigma^2$ (D) $r/\lambda^2$

9. The sample {1, 1, , 3, 3, 3, 5, 5, 7, 7, 7} has ..... mode(s)?

(A) 7 (B) More than one (C) 3 (D) 2

10. For the data set {0,1, 1, 1, 3, 3, 4, 5, 5, 7, 7, 7, 8}, find median

(A) 3 (B) 2 (C) 4 (D) 7

11. Find the confidence width, if $n$=9 and known, $\sigma$ and normal population.

(A) $z_{\alpha}\, s/12$ (B) $2\, z_{\alpha/2}\, \sigma/3$ (C) $z_{\alpha/2}\, \sigma/3$ (D) $6\, z_{\alpha/2}\, s$

12. Find the mean of $f(x) = 6x(1-x)$, where, $0 < x < 1$.

(A) 0.5 (B) 2 (C) 6 (D) $\mu$

13. For what value of $n$ is $2 * {}^{n}C_3 = {}^{n}P_2$ ?

(A) 3 (B) 5 (C) 10 (D) 0 or 5

14. Find $k$ in the continuous (*pdf*): $f(x) = k\, e^{0.66x}$, $0 < x < 1$.

(A) 0 (B) 1.4164 (C) 0.7060 (D) 0.66

15. Find the correlation coefficients between independent random variables X and Y.

(A) -1 (B) 1000 (C) 0 (D) 1

**Q2** (10 Marks)

a) Consider the following data:

| x | 548 | 638 | 678 | 390 | 422 | 285 | 452 | 358 |
|---|---|---|---|---|---|---|---|---|
| y | 150 | 180 | 200 | 120 | 125 | 92 | 130 | 100 |

Find the linear regression equation of $Y$ on x and y(500).

b) A bias coin (P(head)=9P(tail)) is thrown several times. What is the probability of getting first head befor the tenth toss.

**Q3** **(15 Marks)**

**Given the probability density function (pdf):** $f(x) = 1.5\sqrt{x}$, $0 \le x \le 1$. **Find:**

a) **P($X$>0.25),**

b) **the mean and the variance,**

c) **the 4$^{th}$ non-central moment** $\mu_4'$.

**Q4** **(10 Marks)**

**The following data are available:,** $n$**=25,** $\bar{x} = 26$, $s = 2.5$ **and the population is normal.**

**a) Test The null hypothesis:**

$H_0$: $\mu =$ **25 , against the alternative hypothesis:**

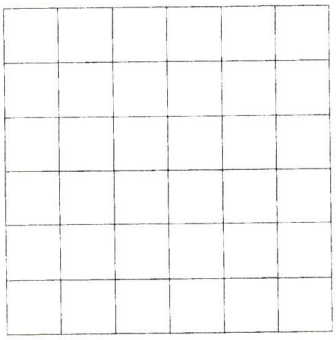
$H_A$: $\mu >$ **25 .** Let $\alpha = 0.025$.

**b) Set a** ***80 %*** **two-sided confidence interval on the mean.**

**Q5** **(10 Marks)**

a) Using the *graphical method* , find the minimum and maximum values of the function: $z = 40x + 20y$ , which is subjected to the following constraints : $x + y \leq 5$ , $y \leq 1 + x$ , $x + y \geq 1$ , $x \geq 0$ and $y \geq 0$ .

b) Using the *simplex method*, find the maximum of the function: $z = 4x + 3y$ which is subjected to the following constraints: $-x + y \leq 2$ , $x + y \leq 2.25$ , $x \geq 0$ , $y \geq 0$ .



مربعات رسم بياني للسؤال (5-a)