SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT-211-Term053-I-Quiz #5

Name: ID: Serial:

Question One (2+2+2=6-Points)

If the ratio of defective items in a shipment is 25%, a sample of size five is taken randomly with replacement, then:

a. Find the probability that there will be two defective items

$n=5,\ p=0.25,\ q=1-0.25=0.75$

$$P(X=2)=C_2^5(0.25)^2(0.75)^3=0.2637$$

b. Find the probability that all items are not defective.

$$P(X=0)=C_0^5(0.25)^0(0.75)^5=0.2373$$

c. Find the expected number and the standard deviation of defective items in this sample?

I. $\text{Mean}=E(X)=np=(5)(0.25)=1.25$

II. $\text{Standard deviation}=\sigma=\sqrt{npq}=\sqrt{(5)(0.25)(0.75)}$

$$=\sqrt{0.9375}=0.9682$$

Question Two (4-Points)

1. The number of a customers in a certain bank follow a Poisson distribution with an average of five customers per hour, then the probability of three customers in 45 minutes is:

   a. 0.0235 **b. 0.2067** c.0.8547 d.0.1755

2. In a certain group there are 5 management, 4 finance, and 3 economic students, if a sample of size 3 is randomly taken without replacement, then the probability that there are one from each topic is :

   a. $\frac{1}{22}$ b. $\frac{7}{11}$ **c.** $\frac{3}{11}$ d. $\frac{2}{11}$

3. The yearly incomes for a group of 5,000 professional people is normally distributed with mean $\mu=\$60,000$ and standard deviation $\sigma=\$5000$. Then the number of these people have a yearly income less than \$70,000 is:

   a. 4886 b. 2386 c.114 d.2500

4. If X has exponential distribution with a mean = 0.5, then the value of $P(X \le 0.75)$ is :

   a.0.3127 b.0.6873 c.0.2231 **d. 0.7769**

NOTE: you may use One of the following areas, where

z_0	0.2	0.5	1.5	2.0	2.2	2.25
$P(0<Z<z_0)$	0.0793	0.1915	0.4332	0.4772	0.4861	0.4878

SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT-211-Term053-II-Quiz #5

Name: ID: Serial:

Question One (2+2+2 = 6-Points)

If the ratio of defective items in a shipment is 20%, a sample of size five is taken randomly with replacement:

a. Find the probability that there will be two defective items

$n = 5,\ p = 0.20,\ q = 1 - 0.20 = 0.80$

$$P(X = 2) = C_2^5 (0.2)^2 (0.8)^3 = 0.2048$$

b. Find the probability that all items are not defective.

$$P(X = 0) = C_0^5 (0.2)^0 (0.8)^5 = 0.32768$$

c. Find the expected number and the standard deviation of the defective items in this sample?

I. $\text{Mean} = E(X) = n\,p = (5)(0.2) = 1$

II. $\text{Standard deviation} = \sigma = \sqrt{n\,p\,q} = \sqrt{(5)(0.2)(0.8)}$

$$= \sqrt{0.8} = 0.8944$$

Question Two (4-Points)

1. The number of a customers in a certain bank follow a Poisson distribution with an average of five customers per hour, then the probability of two customers in 15 minutes is:

   a. 0.0842 b.0.7762 **c. 0.2238** d. 0.9158

2. In a certain group there are 5 management, 4 finance, and 3 economic students, if a sample of size 3 is randomly taken without replacement, then the probability that there are one from each topic is :

   a. $\frac{7}{11}$ b. $\frac{1}{22}$ c. $\frac{2}{11}$ **d.** $\frac{3}{11}$

3. The yearly incomes for a group of 5,000 professional people is normally distributed with mean $\mu = \$60,000$ and standard deviation $\sigma = \$5000$. Then the number of these people have a yearly income over \$70,000 is:

   a. 2500 b. 2386 c. 228 **d. 114**

4. If X has an exponential distribution with $\lambda = 0.75$, then the value of $P(X \le 3)$ is :

   a.0.1054 **b.0.8946** c.0.0498 d. 0.9502

NOTE: you may use One of the following areas, where

z_0	0.2	0.5	1.5	2.0	2.2	2.25
$P(0 < Z < z_0)$	0.0793	0.1915	0.4332	0.4772	0.4861	0.4878