Name
Asad Khan

ID 14944.

Dept Bs(cs) 4th semes

Assignment Sessional Assignment

Subject Probability & Statistics

Submitted to Sir
Daud Khan
Khalil

Date 12/6/2020

Asad Khan ① 14949

Q1 a

Ans a Solution

we know that

$$Mean = nP$$

$$4 = nP$$

$$P = \frac{4}{n} \quad -① $$

Also we knew that

$$Variance = nP(1-P)$$

$$9 = n\left(\frac{4}{n}\right)\left(1-\frac{4}{n}\right)$$

$$9 = 4\left(1-\frac{4}{n}\right)$$

$$9 = 4 - \frac{16}{n}$$

$$\frac{16}{n} = 4-9$$

$$\frac{16}{n} = -5$$

$$-5n = 16$$

$$\boxed{n = \frac{-16}{5}}$$

Sh
an
Th
and
de
The

Asad Khan (2) 14844

Put in eqn - (1)

$$P = \frac{4}{-10/5} = \frac{-20}{16}$$

$$\boxed{P = \frac{-5}{4}}$$

Hence $n = \frac{-16}{5}$ and $P = \frac{-5}{4}$

Ans (b) a critical Region

The set of cri comes o Telied Test for which the null hypothesis is to be rejected is called critical region.

Ans (c) Properties of T- distribution

Coke standard normal distribution the shape of T- distribution in also bell-shaped and symmetrical with mean zero

The variance is always greater than one and can be defined only when the degree of freedom = 3 and is given as

$$Var(t) = \frac{v}{v-2}$$

The T- distribution has greater variblity then be standard normal distribution.

Asad Khan ③ 14944

Ans@ Analysi of variance

Anaklis of variance (ANOVA) is an anlysis Toot used in statisti Par splits an observed aggregare varibition found insid a dato Ser into Two Par system Reation

The sysmd foice have a sration infharnce on The given data set white The random Jucio do no Par indepen ded varios have an regission study.

Ans © R.B.D is is Randamized Block Design

in a randomized block design Pere in only one Priniage factor under considaration in The expermens simiter Test subject are grouped into blocks

Each blocks in Tested subject and Treatmen wels of the Primery Jairor or random order

Ans © staristical Cuatity contior a staticly Qualiy contro refers to Pe use of statiscaul method in the monitoring and maintaining of the

Asad Khan (4) 14941

Quality of Product and service soc uses different Tools to analyze quality Problem:

1) Descriptive Statistics

2) Statistic Process control

3) Acceptance sampling

Ans (9) a chance caves

A Process Par is operating with only chance causes of veration Present is said To be in starised control in other words The chance cause are an inherent Part of the Process

Assingnable cause a
Assignable cause is an identification specific cause of variation in a given Proceed or measurement A cause of varition That is not random and does not cause by chance is assignable.

Asad Khan (5) 19999

Ans (a) Traffic Intensity

it is defined as the ratio of the Time during which a jevitiy is Camacaling occPied To The Time

This facrity is owalible for ouerPing

The Terffie intensity

$$\frac{a}{R}$$

Ans (c) charcleristive of Quering Theory

from Re set of Constioners weitring for sensue next (eg) fIfo (first - in - firtion) also known as FCFS (Frist - Come firoserel) Ffo (lost - infirst - out)

Do we have
Balking Constion deeiding nor to Join The Quence it is Too long)

Ronging Constomer Ceusi The Ques of They have contred too long for Searliee.

Asad khan (6)

14944

Q 2

Ans a The Probabily fumction for a binamial randic variable is

$$b(x, n, P) = \binom{n}{x} P^{x} (1-P)^{n-x}$$

if random varible with this Probbility distribution

$$E(x) = \sum_{x=0}^{n} n \binom{n}{x} P^{x} (1-P)^{n-x}$$

$$= \sum_{n=0}^{n} x \frac{n!}{x!(n-x)} P^{x} (1-P)^{n-x}$$

$$= \sum_{n=1}^{n} \frac{n!}{(n-1)(n-x)} P_x (1-P)^{n-x}$$

Te $Y = x-1$ and $n-a = n-1$

$x = y+1$ and $n = m+1$

$$E(x) = \sum_{y=0}^{n} \frac{m+1}{y!(m-y)} P^{y+1} (1-P)^{m-y}$$

Binomial Thrm says Par

$$(a+b)^{m} = \sum_{y=0} \frac{x^{s}}{y!(m-y)} a^{y} b^{m-y}$$

Scanned with CamScanner

Asad khan (7) c4944

Seiling $a = P$ and $b = 1-P$

$$\sum_{y=0}^{m} \frac{m!}{y!(m-y)} P^{y} (1-P)^{m-y} =$$

$$\sum_{y=0}^{m} \frac{m!}{y!(m-y)} a^{y}\, m-y$$

$$= (a+b)^{m} = (P + 1-P)^{m} = 1$$

So Pees

$$\boxed{E(x) = nP}$$

Sinaclesy bas This time

and $m = n-2$

$$E(x(x-1)) = \sum_{n=0}^{n} n(n-1) \binom{x}{4} P^{x} (1-P)^{n-4}$$

$$= \sum_{n=0}^{n} n(n-1) \frac{n!}{(n-x)} Px (1-P)^{n-4}$$

$$= \sum_{n+2}^{n} \frac{n!}{(n-2)!(n-x)} Px (1-P)^{n-4}$$

$$= n(a-1)P^{2} \sum^{n} \frac{(n-2)}{(n-2)(n-x)} P^{x-2} (1-P)^{x-n}$$

$$= n(n-1)P^{2} \sum_{y=0}^{m} \frac{m!}{y!(m-y)} P^{y} (1-P)^{m-y}$$

Asad Khan (8) 14944

$= n(n-1)p\,(p + (1-p))^m$

$= n(n-1)p^2$

The varion of x is

$E(x^2) - E(x)^2 = E(x)(x-1) + E(x)$

$E(x)^2 = n(n-1)p^2 + np - (np)$

$= (np)^2 - np^2 + np - (np)^2$

$np - np^2$

$= np(1-p)$

Ans 6 a: Let denote number of cars hired out per day

Possion distribution mean $= \lambda = 1.5$

$P(x=2) = \frac{e^{-\lambda}\lambda^2}{2} = \frac{e^{1.5}(1.5)^2}{2}$

i) P(neither car is used)

$P(x=0) = \frac{e^{1.5}(1.5)}{0} = e^{-1.5}$

$P(x=0) = 0.2231$

Scanned with CamScanner

Asad khan (9) 14944

Proportion of day on which nesPor car is used

0.2231 = 22.31%

P (some demand is refused)

P(Demand is more than is car per days)

$P(z>2) = 1-P(z\le 2)$

$= 1-\{P(z=0)+P(z=1)+P(z=2)\}$

$= 1-[(e^{-1.5})(1.5)^0/0!)+(e^{-1.5})(1.5)^1/1!)+(e^{-1.5}(1.5)^2/2!)]$

$= 1-e^{-1.5}(1+1.5+(2.25/2))$

$= 1-e^{-1.5}((1+1.5)+1.25)$

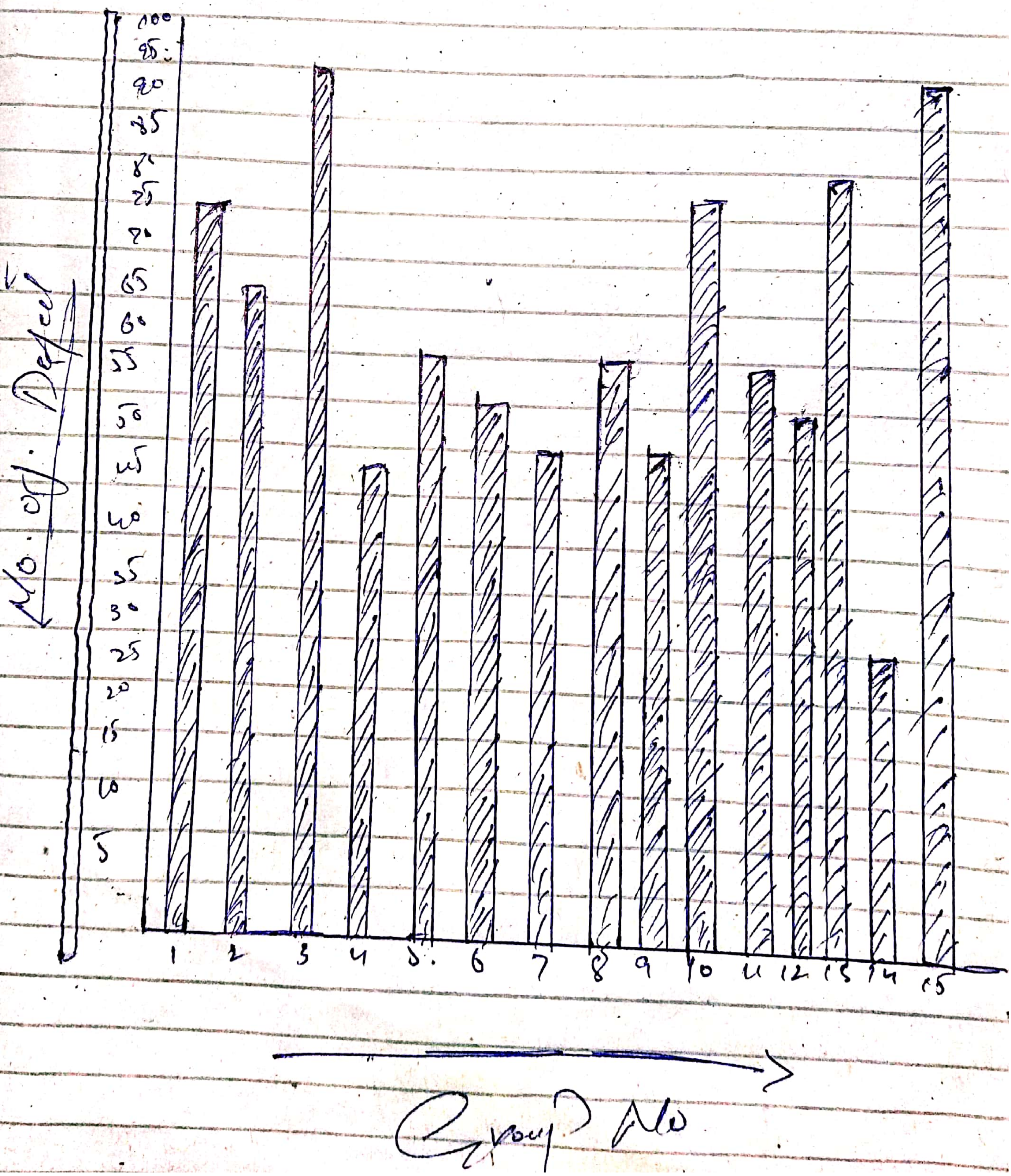
$= 1-e^{-1.5}(3.625)$

$= 1-0.8087$

$= 0.912$

Proportion of day on which some demand refuse = 19.12%

Suitable chart



Scanned with CamScanner