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Assign probability

Q 1:-

$np = 4$

1) variance = 3

2) dividing the LHS & RHS $= 3/4 = 1 - 3/4 = 1/4$,

$p = 1/4$ we have $N = 16$

B:-

A critical region also known as the rejection region is a set of values for the test statistics for which the null hypothesis is rejected if the observed test statistics is in the critical region the we reject the null hypothesis & accept the alternative hypothesis

C

. The mean of the distribution is equal to 0.

. The variance is equal to $v/(v-2)$ where v is the degree of freedom.

. The variance is always greater than 1.

D:-

Analysis of variance or anova is a statical method that separates observed variance

data into diff components to use for additional test. A one way anova is used for these one or more groups of data to gain info about the relationship between the dependant & indepent variable

E:-
A diagram that gives the relationship b/w the component states & the success or of a specified system function. The logical layout in our RBD can be of series system parallel or a combination

7:-
Statical quality control: the use of statical method in the monitoring and maintaining of the quality of products.

8:-
Chance cause: A process that is operating with only chance causes of variation present.
Assignable cause:-
is a type of variation in which a specific identity or event can be linked to inconsistency is a system.

H:-

Traffic intensity:-

A measure of the average occupancy of the facility during a specified period of time, normally a busy hour measured in traffic Units during which a facility is occupied to the time this facility is available for occupancy.

I:-

A queuing system is specified completely by the following five basic characteristics The input process it express the mode of arrival the customer at the service facility governed by some probability law the no of customer unite from finite or infinite sources.

Q NO # 2

(A)

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

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

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

Since then $x=0$ term variables. let $y = x-1$ & $m = n-1$ Subbing $x = y+1$ & $n = m+1$ into the last sum (& using the fact that the limits $x=1$ & $x=n$ correspond to $y=0$ & $y = n-1 = m$, respectively)

$$\therefore E(X) = \sum_{y=0}^{m} \frac{(m+1)!}{y(m-y)!} p^{y+1} (1-p)^{m-y}$$

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

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

The binomial theorem say that

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

Setting $a = p$ & $b = 1-p$

$$\sum_{y=0}^{m} \frac{m!}{y!(m-y)!} p^y (1-p)^{m-y} = \sum_{y=0}^{m} \frac{m!}{y!(m-y)!} a^y b^{m-y} = (a+b)^m = (p+1-p)^m$$

$$= 1$$

So that

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

Similarly but this time using $y = x-2$ & $m = n-2$

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

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

$$= \sum_{x=2}^{n} \frac{n!}{(x-2)!(n-x)!} p^x (1-p)^{n-x}$$

$$= n(n-1)p^2 \sum_{x=2}^{n} \frac{(n-2)!}{(x-2)!(n-x)!} p^{x-2} (1-p)^{n-x}$$

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

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

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

So the varience of x is

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

$$\boxed{= np(1-p)}$$

part (b)

let x denote numbers of cars hired out per day

poission distribution mean = m = 1.5

p(X = x) = (((e^-m)(m^x))/(x!)) = (((e^-1.5)(1.5^x))/(x!))

1) p(neither car is used).

p(X=0) = (e^-1.5)(1.5^0)/ 0.2231

2) p(some demand is refused) = p(Demands is more than 2 cars per day

$= P(x>2)$

$= 1 - P(x \leq 2)$

$= 1 - [P(x=0) + P(x=1) + P(x=2)]$

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

$= 1 - e^{1.5}[1 + 1.5 + (2.25/2)] = 0.1912$ proportion of days on which neither car is used

$= 0.2231 = 22.31\%$ proportion of days on which some demand is refused $= 0.1912 = 19.12\%$

Q NO#3