

Dr. Latif and Raja Latif and Muhammad Latif and Abdul Latif

Contents

Marks: 20; Time: 30 Minutes

NAME:.....

I.D.#:

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SERIAL# SECTION #: (check one-7)

		10 a	1 p	2 p
		3 m	6 m	7 m

NOTE: SHOW COMPLETE WORK.

Question	Max	Marks	Remarks
1	5		
2	6		
3	4		
4	5		
<i>Maximum</i>	20		
<i>Remarks</i>			

Binomial Distribution:

$$f(x) = P(X = x) = \binom{n}{x} p^x q^{n-x}$$

Where $x = 0, 1, 2, 3, \dots, n$; $q = 1 - p$.

p = probability of success and

q = probability of failure on any trial.

Q.1.(Binomial Distribution). Multiple Choice Quiz. Each question in a FIVE-question multiple-choice quiz has THREE choices, only one of which is correct.

If a student guesses at all questions, find the probability that

(a) exactly FOUR questions will be CORRECT.

(b) AT MOST (Maximum) ONE questions will be correct.

(c) Find the Mean of X .
 $\mu = E(X) = \underline{\hspace{2cm}}$

(d) Find the Variance of X :
 $\text{Var}(X) = \sigma^2 = \underline{\hspace{2cm}}$

Q.2. THREE PERSONS are selected from a group of **FIVE MEN** and **FIVE WOMEN**.

Let the random variable X has the **NUMBER** of **MEN** selected. Find the probability distribution of X .

$X = x$	$f(x) = P(X = x)$
0	
1	
2	
3	

Note that $f(x) = P(X = x)$ represents the probability that exactly x number of men (and $(3 - x)$ women) are selected in a sample of 3, where $x = 0, 1, 2, 3$.

Complete the above probability distribution table.

Q.3. 480TB23. (Binomial Distribution). Genders of Children. If a family has Six children, find the probability that at most (Maximum) two are girls. (Let the random variable X be the number of girls in the family with Six children. Assume that the probability that a child is a girl is $p = \frac{1}{2}$).

$$P(X \leq 2) = \underline{\hspace{2cm}}$$

Q.4. For the following probability distribution

$X = x$	$f(x) = P(X = x)$
234	0.20
323	0.50
434	0.30

(a) Find

the expected value of X :

$$\mu = E(X) = \dots\dots\dots$$

(b) Find

$$E(X^2) = \text{-----}$$

(c) Find

the Variance of X :

$$VAR(X) = \sigma^2 =$$

$$E[X^2] - [E(X)]^2 = \underline{\hspace{2cm}}$$

(d) Find the following probabilities:

(i) $P(X > 333) = \underline{\hspace{2cm}}$

(ii) $P(200 < X < 400) = \underline{\hspace{2cm}}$

(iii) $P(X = 1) = \underline{\hspace{2cm}}$

(iv) $P(4X = -2X + 468) = \underline{\hspace{2cm}}$

(v) $P(X \neq 234) = \underline{\hspace{2cm}}$