

Unit 3 (i) mcqs

(this file includes most of the Memory based questions for concept purpose and also some calculation based questions)

. Binomial Distribution is given by a Swiss Mathematician _____

- a) Simon De Poisson**
- b) C.F. Gauss**
- c) James Bernoulli**
- d) De Movire**

MCQ .1

A Bernoulli trial has:

- (a) At least two outcomes
- (b) At most two outcomes
- (c) Two outcomes**
- (d) Fewer than two outcomes



MCQ .2

The two mutually exclusive outcomes in a Bernoulli trial are usually called:

- (a) Success and failure**
- (b) Variable and constant
- (c) Mean and variance
- (d) With and without replacement

MCQ .3

Nature of the binomial random variable X is:

- (a) Quantitative
- (b) Qualitative
- (c) Discrete**
- (d) Continuous

MCQ .4

In a binomial probability distribution, the sum of probability of failure and probability of success is always:

- (a) Zero
- (b) Less than 0.5
- (c) Greater than 0.5
- (d) One**

MCQ .5

In a binomial experiment, the successive trials are:

- (a) Dependent
- (b) Independent**
- (c) Mutually exclusive
- (d) Fixed

MCQ .6

The parameters of the binomial distribution are:

- (a) n and p**
- (b) p and q
- (c) np and nq
- (d) np and npq

MCQ .7

The range of binomial distribution is:

- (a) **0 to n** (b) 0 to ∞ (c) -1 to +1 (d) 0 to 1

MCQ .8

The mean and standard deviation of the binomial probability distribution are respectively:

- (a) np and npq (b) **np and \sqrt{npq}** (c) np and nq (d) n and p

MCQ .9

In a binomial experiment with three trials, the variable can take:

- (a) 2 values (b) 3 values (c) **4 values** (d) 5 values

MCQ .10

The shape of the binomial probability distribution depends upon the values of its:

- (a) Mean (b) Variance (c) **Parameters** (d) Quartiles

MCQ .11

In binomial distribution the numbers of trials are:

- (a) Very large (b) Very small (c) **Fixed** (d) Not fixed

MCQ .12

In a binomial probability distribution, relation between mean and variance is:

- (a) Mean < Variance (b) Mean = Variance
(c) Mean > Variance (d) Difficult to tell

MCQ .13

In binomial distribution when $n = 1$, then it becomes:

- (a) Hypergeometric distribution (b) Normal distribution
(c) Uniform distribution (d) **Bernoulli distribution**

MCQ .14

The mean of a binomial distribution depends on:

- (a) Number of trials (b) Probability of success
(c) Probability of failure (d) **Number of trials and probability of success**

MCQ .15

The variance of a binomial distribution depends on:

- (a) Number of trials (b) Probability of success
(c) Probability of failure (d) **All of the above**

MCQ .16

Which of the following is not property of a binomial experiment?

- (a) Probability of success remains constant
- (b) **n** is fixed
- (c) Successive trials are dependent**
- (d) It has two parameters**

MCQ .17

The binomial probability distribution is symmetrical when:

- (a) $p = q$**
- (b) $p < q$
- (c) $p > q$
- (d) $np > npq$

MCQ .18

The binomial distribution is negatively skewed if:

- (a) $p < 1/2$
- (b) $p = 1/2$
- (c) $p > 1/2$**
- (d) $p = 1$

MCQ .19

In a binomial probability distribution, the skewness is positive for:

- (a) $p < 1/2$**
- (b) $p = 1/4$
- (c) $np = npq$
- (d) $np = nq$

. If 'X' is a random variable, taking values 'x', probability of success and failure being 'p' and 'q' respectively and 'n' trials being conducted, then what is the probability that 'X' takes values 'x'?

- a) $P(X = x) = {}^nC_x p^x q^x$
- b) $P(X = x) = {}^nC_x p^x q^{(n-x)}$
- c) $P(X = x) = {}^nC_x q^x p^{(n-x)}$
- d) $P(X = x) = {}^nC_x p^{(n-x)} q^{(n-x)}$

In a Binomial Distribution, if $p = q$, then it is a _____

- a) Symmetrical Distribution
- b) Asymmetrical Distribution
- c) Undistributed Distribution
- d) Irregular Distribution

A Bernoulli trial has:

- a) At least two outcomes
- b) At most two outcomes
- c) Two outcomes
- d) Fewer than two outcomes

Nature of the binomial random variable X is:

- a) Quantitative
- b) Qualitative
- c) Discrete
- d) Continuous

The two mutually exclusive outcomes in a Bernoulli trial are usually called:

- a) Success and failure
- b) Variable and constant
- c) Mean and variance
- d) With and without replacement

In a binomial probability distribution, the sum of probability of failure and probability of success is always:

- a) Zero
- b) Less than 0.5
- c) Greater than 0.5
- d) One

In a binomial experiment, the successive trials are:

- a) Dependent
- b) Independent
- c) Mutually exclusive
- d) Fixed

The parameters of the binomial distribution are:

- a) n and p
- b) p and q
- c) np and nq
- d) np and npq

The range of binomial distribution is:

- a) 0 to n
- b) 0 to ∞
- c) -1 to +1
- d) 0 to 1

In a binomial probability distribution, relation between mean and variance is:

- a) Mean < Variance
- b) Mean = Variance
- c) Mean > Variance
- d) Difficult to tell

The variance of a binomial distribution depends on:

- a) Number of trials
- b) Probability of success
- c) Probability of failure
- d) All of the above

The binomial probability distribution is symmetrical when:

- a) $p = q$
- b) $p < q$
- c) $p > q$
- d) $np > npq$

The binomial distribution is negatively skewed if:

- a) $p < 1/2$
- b) $p = 1/2$
- c) $p > 1/2$
- d) $p = 1$

In a binomial probability distribution, the skewness is positive for:

- a) $p < 1/2$
- b) $p = 1/4$
- c) $np = npq$
- d) $np = nq$

A die is thrown 100 times. If getting an even number is considered a success, then the standard deviation of the number of successes is

- (A) $\sqrt{50}$ (B) 5 (C) 25 (D) 10

b

For a binomial distribution, $n = 5$. If $P(X=4) = P(X=3)$ then $p = \dots$

- (A) $\frac{1}{3}$ (B) $\frac{3}{4}$ (C) 1 (D) $\frac{2}{3}$

d

In a binomial distribution, $n = 4$. If $2P(X=3) = 3P(X=2)$ then $p = \dots$

- (A) $\frac{4}{13}$ (B) $\frac{5}{13}$ (C) $\frac{9}{13}$ (D) $\frac{6}{13}$

c

If $X \sim B(4, p)$ and $P(X=0) = \frac{16}{81}$, then $P(X=4) = \dots$

- (A) $\frac{1}{16}$ (B) $\frac{1}{81}$ (C) $\frac{1}{27}$ (D) $\frac{1}{8}$

b

$Q=2/3$ $p=1/3$

The probability of a shooter hitting a target is $\frac{3}{4}$.

How many minimum number of times must he fire so that the probability of hitting the target at least once is more than 0.99?

(A) 2

(B) 3

(C) 4

(D) 5

C

Hint $P(X \geq 0) > 0.99$ or

If the mean and variance of a binomial distribution are 18 and 12 respectively, then $n = \dots$

(A) 36

(B) 54

(C) 18

(D) 27

B

1) If $X \sim NB(K, p)$ then variance of X is _____

i) $\frac{Kq}{p}$

ii) $\frac{Kq}{p^2}$

iii) $\frac{Kp}{q}$

iv) $\frac{Kp}{q^2}$

li

NBD negative binomial distribution or $b^*(x, 5, 0.5)$

2) Suppose $X \sim NBD(5, 0.5)$ then variance of X is _____

i) 5

ii) 10

iii) 15

iv) 20

li

3) Suppose $X \sim NBD(k,p)$ it reduces to geometric distribution if

-
- i) $k=0$
 - ii) $p=0$
 - iii) $k=1$
 - iv) $p=1$

A i

4) For Negative Binomial Distribution

- i) Mean=Variance
- ii) Mean < Variance
- iii) Mean > Variance
- iv) None of these

A ii

6) If $X \sim NB(k_1, P_1)$ independent of $Y \sim NB(k_2, P_2)$ then $X+Y$ follows

- i) Geometric distribution
- ii) $NB(k_1+k_2, p_1+p_2)$
- iii) $NB(k_2+k_2, p)$ if $p_1=p_2=p$
- iv) $NB(k, p_1+p_2)$ if $k_1=k_2=k$

A iii

1) If $X \sim G(\frac{1}{3})$ then mean of X is _____

- i) 3
- ii) 1
- iii) 2
- iv) $2/3$

2) If $X \sim G(0.2)$ then mean of X is _____

- i) $1/4$
- ii) $1/2$
- iii) $3/4$
- iv) 4

Note

For geometric distribution there is memoryless (lack of memory)property

Memorylessness is defined as:

$$P(X \geq k + x | X > x) = P(X \geq k)$$

3) Which of the following discrete distribution has lack of memory property _____

- i) Poisson distribution
- ii) Geometric distribution
- iii) NBD
- iv) None of these

4) If $X \sim G(p)$ then $P[x \geq 6 / x \geq 3] = _____$

- i) $p(x \geq 6)$
- ii) $p(x \geq 3)$
- iii) $p(x \geq 2)$
- iv) None of these



5) Let X be geometric variate with mean 1.5 then $P(X = 1)$

- i) 0.4
- ii) 0.24
- iii) 0.6
- iv) 0.5

6) Let $X \sim G(P)$ then mean of X is _____

- i) $\frac{q}{p}$
- ii) $\frac{q}{p^2}$
- iii) $\frac{p}{q}$
- iv) $\frac{p}{q^2}$

7) If $X \sim \text{Geometric}(P)$ then _____

- i) $P(X > s+t / X > s) = P(X > s)$
- ii) $P(X > s+t / X > s) = P(X > s+t)$
- iii) $P(X > s+t / X > s) = P(X > t)$
- iv) $P(X > s+t / X > s) = P(X < t)$

8) If X = number of candidates required to interview for the post of an officer, then X follows _____

- i) Binomial distribution
- ii) Bernoulli distribution
- iii) Poisson distribution
- iv) Geometric distribution

10) If $X \sim \text{Geometric}(P)$ taking values 1,2,..... Then

-
- i) Mean = Variance
 - ii) Mean < Variance
 - iii) Mean > Variance
 - iv) Mean = 2 Variance

Poisson Distribution is given by:

- a) **Simon De Poisson**
- b) C.F. Gauss
- c) James Bernoulli
- d) De Movire

In some of following mcqs in place of lambda it m given

The p.d.f of Poisson Distribution is given by _____

a) $e^{-m} \cdot m^x$

$x!$

b) $e^{-m} \cdot x!$

m^x

c) $x! \cdot m^x$

e^{-m}

d) $e^{-m} \cdot m^x$

$x!$

A

In a Poisson Distribution, if 'n' is the number of trials and 'p' is the probability of success, then the mean value is given by _____

- a) $m = np$
- b) $m = (np)^2$
- c) $m = np(1-p)$
- d) $m = p$

If 'm' is the mean of a Poisson Distribution, then variance is given by _____

- a) m^2
- b) $m^{1/2}$
- c) m
- d) $\frac{m}{2}$

If 'm' is the mean of a Poisson Distribution, the standard deviation is given by _____

- a) \sqrt{m}
- b) m^2
- c) m
- d) $\frac{m}{2}$

In a Poisson Distribution, the mean and variance are equal.

- a) True
- b) False

In a Poisson Distribution, if mean (m) = e , then $P(x)$ is given by _____

a) $\frac{e^{x-m}}{x!}$

b) $\frac{e^{(m-x)}}{x!}$

c) $\frac{x!}{e^{(m-x)}}$

d) $\frac{x!}{e^{(x-m)}}$

In a Poisson Distribution, if mean (m) = e , then $P(x)$ is given by _____

a) $\frac{e^{x-m}}{x!}$

b) $\frac{e^{(m-x)}}{x!}$

c) $\frac{x!}{e^{(m-x)}}$

d) $\frac{x!}{e^{(x-m)}}$

Poisson distribution is applied for _____

- a) Continuous Random Variable
 - b) Discrete Random Variable**
 - c) Irregular Random Variable
 - d) Uncertain Random Variable
-

For a Poisson Distribution, if mean(m) = 1, then $P(1)$ is?

- a)** $\frac{1}{e}$
 - b) e
 - c) $\frac{e}{2}$
 - d) Indeterminate
-

If 'm' is the mean of Poisson Distribution, the $P(0)$ is given by _____

- a)** e^{-m}
 - b) e^m
 - c) e
 - d) m^{-e}
-

1) If $X \sim P(\lambda)$ then _____

- i) Mean=Variance
- ii) Mean > Variance
- iii) Mean < Variance
- iv) Mean = 2Variance

3) The mean and variance of the _____ are same.

- i) Poisson distribution
- ii) Geometric distribution
- iii) Negative binomial distribution
- iv) None of these

4) Limiting form of poisson distribution is _____

- i) Poisson distribution
- ii) Uniform distribution
- iii) Normal distribution
- iv) None of these

5) Let X has poisson distribution with mean 3. Then variance of $(2X+3)$ is _____

- i) 12
- ii) 3
- iii) 6
- iv) Zero

6) Let X and Y be two independent poisson random variables with mean 4 and 6 respectively then the variance of $X+Y$ is _____

a)2 b) 6 c) 10 d)2

1) For Poisson distribution find $P(2)$ given $\lambda = 0.7$ [$e^{-0.7} = 0.497$]

- a) 0.13 b) 0.14 c) 0.12 d) 0.9

c

2) "Mean of Poisson distribution is 5 while S.D. is 4" Given statement:

- (i) True
- (ii) False
- (iii) True for some cases
- (iv) None of above

ii

3) If x is Poisson variate such that $P(x=1) = 2P(x=2)$. Then λ and σ are

- a) 1 and 1
- b) 1 and 2
- c) 4 and 2
- d) 2 and 1

A

4) 8% of people are left-handed. What is the probability that 2 or more of random sample of 25 are left-handed. [$e^{-2} = 0.1353$]

- a) 0.692
- b) 0.595
- c) 0.729
- d) 0.525

B

$$1-p(0)-p(1)$$

Q) Suppose a book of 585 pages contain 43 pages with misprints. If these pages are randomly distributed throughout the book; what is the probability that 10 pages, selected at random, will be free from pages with misprints. [Take $e^{-0.735}=0.4795$] a.

- a) 0.4227 b) 0.4327 c) 0.4795 d) 0.525

C

In a book of 520 pages, 390 typographical error occur. Assuming Poisson law for the number of errors per page, then the probability of a page has no error is

- a) 0.75 b) $e^{0.75}$ c) $e^{-0.75}$ d) e^2