MATHS

BOOKS - NAVBODH MATHS (HINGLISH)

BINOMIAL DISTRIBUTION

Solved Examples

1. A fair coin is tossed 5 times . Find the probability that it shows exactly three times head.

2. The probability that certain type of component will survive a check test is 0.5. Find the probability that exactly tow of the next four componets will suvive.

3. Given X ~ B(n,p) If n= 20,, E(x)= 10 , Find p, Var(X) and S.D (X)

4. A fair coin is tossed 8 times. Find the probability that it shows heads

(i) exactly 5 times (March ' 17)

(2) at lest once . (March ' 14- 17)

5. The probability that a person who undergoes a kidney operation will be recovered is 0.5 .Find the probability that of

the 6 patients who undergo similar operations

(a) noen will recover. (March 16.)

(b) half of them will recover . (oct 13, March ' 16 july 19)

6. An insurance agent insures lives of 5 men, all of the same age and in good health. The probability that a man of this age will survive tha next 30 years is known to be $\frac{2}{3}$. The

probability that in the next 30 years at most three men will survive is

7. Each of the total fice questions in amultiple choice examination has four choices, only one of which is correct.A student is attempting to guess the amswer . The renadom varible X is the number of question answerred correctly. What is the probability that the student will giveat least one correct answer ?

8. Let the p,m f. of r.v X be d

$$p(x) + \binom{4}{x}\left(\frac{5}{9}\right)^{x}\left(\frac{4}{9}\right)^{4-x} \quad , \quad x= \ 0,1,2,3,4. \ .$$

Find E(X) and Var(X)

Examples For Practice

1. A fair coin is tossed 9 times . Find the probability that it shows heads exactly 5 times .

2. The probability that a bomb will hit a target is 0.8 Find the probability that out of 10 bombs dropped.exactly 4 will hit the target .

3. If a die is thrown twice, then find the probability of occurrence of 4 at least once.

4. If $X \sim B(6,p)$ and 2. $P(X=3) = P(X=2)$ then find the value of p

5. Given that X ~ B(n=10, p) .If E (x) = 8, find the value of p .

6. Given X~ B(n,p) . If n = 25 , E(x) = 10, find p and S.D (X)

7. Let X ~ B (n,P). I f E(X) = 5 and Var (x) = 2.5

find n and p

8. Given X~ B (n,P)

If n= 10 and p=0.4 , find E(X) and Var (X) .

9. The probability that a certain kind of component will survive a check test is 0.6 Find the probability that exactly 2 of the next 4 rested componentws suvive.

10. If the probability that a fulurorescent light has a useful life of a least 800 hours is 0.9 find the probability that among 20 such lights at

least 2 will not have a useful life of at least 800 hours. [Given $(0.9) = 0.1348$]

11. The centres for disease control have determined that when a person is given will develop immunity to virus is 0.8 If eight people are given this vaccine find the probability that

(1) none will develop immunity

(2) exactly four will develop immunity .

(3) all will develop immunity ,

12. Suppose that 80% of all families own a television set. If 5 families are inervised at random, find the probability that :

(a) three families own a television set.

(b) at least two families own a television set.

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13. Suppose that 80% of all families own a television set. If 5 families are inervised at

random, find the probability that :

(a) three families own a television set.

(b) at least two families own a television set.

14. The probability of hitting a target in any shot is 0.2 If 10 shorts are fired , find the probability that the target will be hit at least twice. [Given: $(0.8)^9 = 0.1342$]

15. Probability of guessing correctly atleast 7 out of 10 answers in a 'True' or 'False' test is equal to

16. The probability of hitting a target in any shot is 0.5 If 10 shorts are fired , find the probability that the target will be hit in an odd number of times .

1. A die is thrown three times. The probability of obtaining at least one six is

A. $\dfrac{125}{216}$

B. $\dfrac{91}{216}$

C. $\dfrac{1}{216}$

D. $\dfrac{215}{216}$

Answer: A::B

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2. A box contains 100 bulbs out of which 10 are defective. A sample of 5 bulbs is drawn. The probability that none is defective , is

A. $(0.9)^2$

B. 0.9

C. $(0.1)^5$

D. 0.1

Answer: B

3. In a binomial distribution with n= 4 2. P(X=3)

=3. P (X=2) ,then the vlaue of p is

A. $\dfrac{4}{13}$

B. $\dfrac{5}{13}$

C. $\dfrac{9}{13}$

D. $\dfrac{6}{13}$

Answer: C

4. Given that X ~ B(n=10, p) .If E (x) = 8, find the value of p .is

A. 0.6

B. 0.7

C. 0.8

D. 0.4

Answer:

5. Let X ~ B (10, 0.2) then p (x=1) is

A. 0.000268

B. 0.0268

C. 0.1268

D. 0.268

Answer: B

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6. Given X ~ B(n, p) if p =0.6 E(X) =6, then the value of Var (X) is

A. 3

B. 48

C. 18

D. 36

Answer: A

7. Given $X \sim B(n, p)$ if $p = 0.6$ $E(X) = 6$, then the value of Var (X) is

A. 2.4

B. 2.6

C. 2.5

D. 2.3

Answer: A

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8. If the mean and variance of a binomial distribution are 9 and 6 respectively , then n = ...

A. 36

B. 54

C. 18

D. 27

Answer: D

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