

TOPIC: "PROBABILITY DISTRIBUTION AND BINOMIAL DISTRIBUTION"

1. If X is a random variable with probability mass function

$$P(x) = kx \quad \text{for } x = 1, 2, 3$$
$$= 0$$

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Otherwise then $k =$ (a) $\frac{1}{5}$ (b) $\frac{1}{4}$ (c) $\frac{1}{6}$ (d) $\frac{2}{3}$

2. A random variable X has the following probability distribution :

x	0	1	2	3	4	5	6
P(X = x)	k	3k	5k	7k	9k	11k	13k

(a) find k, (b) find $P(0 < X < 4)$ (c) obtain the cumulative distribution function (c.d.f) of X

3. The probability distribution of X the number of defects per 10 metres of a fabric is given by

x	0	1	2	3	4
P(X = x)	0.45	0.35	0.15	0.03	0.02

Find the variance of X

4. A random variable X has the following probability distribution:

X = x	-2	-1	0	1	2	3
P(x)	0.1	0.1	0.2	0.2	0.3	0.1

Then $E(x) = \dots\dots\dots$

(a) 0.8 (b) 0.9 (c) 0.7 (d) 1.1

5. The probability mass function (p.m.f.) of X is given below

$X = x$	1	2	3
$P(X = x)$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{2}{5}$

Find $E(X^2)$

6. A bakerman sells 5 types of cakes .Profits due to the sale of each type of cake is respectively

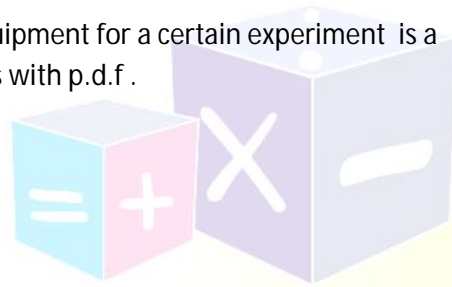
Rs 3, Rs2.5 , Rs2, Rs1.5 Rs1. The demands for these cakes are 10%, 5%, 25%, 45% and 15%

Respectively . what is the expected profit per cake ?

7. The time (in minutes) for a lab assistant to prepare the equipment for a certain experiment is a random Variable X taking values between 25 and 35 minutes with p.d.f .

$$f(x) = \frac{1}{10}, \quad 25 \leq x \leq 35$$

$$= 0, \quad \text{otherwise}$$



What is the probability that preparation time exceed 33 minutes ? Also find the c.d.f. of X

8. Give the p.d.f (probability density function) of a continuous random variable x as :

$$f(x) = \frac{x^2}{3} \quad -1 < x < 2$$

$$= 0 \quad \text{otherwise}$$

Determine the c.d.f (cumulative distribution function) of x and hence find

$$P(x < 1), P(x \leq -2), P(x > 0), P(1 < x < 2)$$

9. 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 the next 30 years is known to be $\frac{2}{3}$.find the probability that in the Next 30 years at most 3 men will survive.

10. 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) none will recover (b) half of them will recover

11. A fair coin is tossed 8 times. Find the probability that it shows heads at least once.

12. The probability that a certain kind of component will survive a check test is 0.6 Find the probability

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That exactly 2 of the next 4 tested components survive.

13. If $X \sim B(n, p)$ and $E(X) = 12$, $\text{var}(X) = 4$, then the value of n is

- (a) 3 (b) 48 (c) 18 (d) 36

14. Let the p.m.f (probability mass function) of random variable x be

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

= 0, otherwise

Find $E(x)$ and $\text{Var}(x)$

15. Give $X \sim B(n = 10, p)$ if $E(X) = 8$ Find the value of p

16. Given $X \sim B(n, p)$. If $n = 20$, $E(X) = 10$, Find p , $\text{Var}(X)$ and S.D (X)

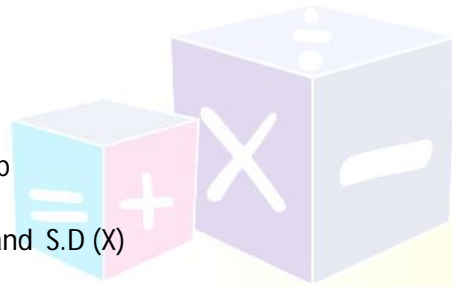
17. If $X \sim B(n, p)$ and $E(X) = 12$, $\text{Var}(X) = 4$, then the value of n is

- (a) 3 (b) 48 (c) c (d) 36

18. Give that $X \sim B(n = 10, p)$, if $E(X) = 8$ find the value of p .

19. A fair coin is tossed five times. find the probability that it shows exactly three times head.

20. A random variable $X \sim N(0, 1)$. Find $P(X > 0)$ and $P(X < 0)$.



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