Binomial Distribution

(Complete Concepts)



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Probability of rescuess is P(x) = ncx px qn-x n -> no of repeated trials p >> probability of a success
q >> probability of a failure. p+q=1 2) C2 = []

(x 12-8

$$n c_0 = 1$$

$$n c_1 = n$$

$$n c_n = 1$$



Mean,
$$m = np$$

Variance = npq
Standard deviation = \sqrt{npq}

Note: when the experiment be repeated 'N' times, the frequency of r success is N'Crp 91-1.

Binomial Distribution

Problem#1

The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that i. exactly 2 will be defective ii. none will be defective iii. atleast 2 will be defective

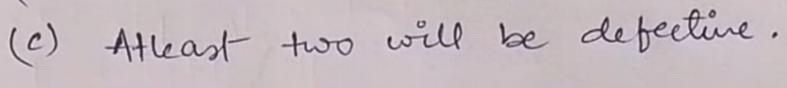
BINOMIAL DISTRIBUTION



Sue 1) The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that (a) Exactly two will be defective.

- (6) None will be defective.
- (c) Atleast two will be defective.

(6) None will be defecture.





Sol-

Total no. of pens, n=12. Probability of a defective pen, $p=\frac{1}{10}=0.1$ Probability of a non-defective pen, q=1-p=0.9

Probability that exactly two will be defective
$$P(2) = {}^{12}C_2(0.1)^2(0.9)^{12-2} = {}^{112}(0.1)^2(0.9)^0$$

$$=\frac{6}{12\times11\times12}(0.1)^{2}(0.9)^{10}=0.2301$$

$$= \frac{12 \times 11 \times 10}{2 \times 10} (0.1) (0.9) = 0.230$$
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(b) Probability that none will be defective
$$P(0) = {}^{12}C_0(0.1)^0(0.9)^{12} = 1\times1\times(0.9)^{12} = 0.2824.$$

(c) Probability that at least two will be defective
$$P(2) + P(3) + P(4) - \cdots + P(12) = 1 - [P(0) + P(1)]$$

$$= 1 - [^{12}C_0[0.1]^0(0.9)^{12} + ^{12}C_1[0.1]^1[0.9]^{11}]$$

$$= 1 - [^{0.2824} + ^{12}(0.1)^1[0.9]^{11}]$$

$$= 1 - [^{0.2824} + ^{0.3766}]$$

= 0.3410 Aus

Binomial Distribution

Problem#2

In a sampling, a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain atleast 3 defective parts.

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