Answer on Question #42119 -Math -Statistics and Probability

Assume that 90% of all industries contain shipping open order files in their computerized database. In a random sample of 10 industries, let X be the number that includes shipping open order files in their computerized database.

i) Find $P(X = 8)$

ii) Find $P(X > 5)$

iii) Find the mean and variance of X.

Solution.

We have the Bernoulli scheme with $n = 10$ trials.

Let p is success probability. We've got that $p = 0.9$.

Now, we construct the probability function:

$$f(k) = P(X = k) = C_{10}^k \cdot p^k \cdot (1 - p)^{10-k}$$

i) $P(X = 8) = C_{10}^8 \cdot p^8 \cdot (1 - p)^8 = \frac{10!}{8! \cdot 2!} \cdot 0.9^8 \cdot 0.1^2 \approx 0.1937$

ii) $P(X > 5) = \sum_{k=6}^{10} C_{10}^k \cdot p^k \cdot (1 - p)^{10-k} \approx 0.9984$

iii)   It is Bernoulli scheme, so we have binomial distribution. Then, mean of X is equal to $n \cdot p = 10 \cdot 0.9 = 9$. Variance of X is equal to $n \cdot p \cdot (1 - p) = 10 \cdot 0.9 \cdot 0.1 = 0.9$

Answer: i) $P(X = 8) \approx 0.1937$,

ii) $P(X > 5) \approx 0.9984$,

iv)   Mean of X is 9, variance of X is 0.9.