

Question

Assume that 10% of the balls in a certain box are red and that 20 balls are selected from the box at random, with replacement. Find the probability that more than 3 red balls will be obtained by using the binomial distribution.

Answer

Let X denote the number of red balls in the 20 balls selected, then $X \sim \text{Binomial}(20, 0.1)$. So

$$P\{X = k\} = \binom{20}{k} 0.1^k 0.9^{20-k}, \quad k = 0, 1, \dots, 20$$

and

$$P\{X > 3\} = 1 - P\{X = 0\} - P\{X = 1\} - P\{X = 2\} - P\{X = 3\} = ?$$