

Ground Rules: Time allowed is 15 minutes, individual work only and closed book test.

Your name Solution

Score :

1. Suppose a population of size 100 contains 30 Green people and 70 Blue people. A sample of size 20 is taken. Find the probability that g , $1 \leq g \leq 20$, Green people are selected in the sample, assuming the sampling to be without replacement

• Sample space $S =$ collection of all 20 element subsets of a 100 element set

• $\mathcal{F} =$ (all subsets of S) - event space

• $\mathbb{P}: \mathcal{F} \rightarrow [0,1]$

$$\mathbb{P}(E) = \frac{|E|}{|S|} = \frac{|E|}{100 C_{20}} \quad E \in \mathcal{F}$$

let $A = \{g - \text{Green people are chosen in sample}\}$

$$|A| = 30 C_g \cdot 70 C_{20-g}$$

$$\therefore \mathbb{P}(A) = \frac{30 C_g \cdot 70 C_{20-g}}{100 C_{20}} \quad \square$$