Answer on Question #62212 – Math – Statistics and Probability

Question

Out of 90 applicants for a job, 60 people get selected after the interview. If five applicants are selected at random, calculate the probability that 2 will get selected.

Solution

In probability theory and statistics, the hypergeometric distribution is a discrete probability distribution that describes the probability of *k* successes in *n* draws, without replacement, from a finite population of size *N* that contains exactly *K* successes, wherein each draw is either a success or a failure. In contrast, the binomial distribution describes the probability of *k* successes in *n* draws with replacement.

We will use the formula for the hypergeometric distribution

$$P(X = k) = \frac{\binom{K}{k}\binom{N-K}{n-k}}{\binom{N}{n}}$$

with parameters $k = 2, n = 5, N = 90, K = 60$:

$$P = \frac{\binom{60}{2}\binom{90-60}{5-2}}{\binom{90}{5}} = \frac{\binom{60}{2}\binom{30}{3}}{\binom{90}{5}} = \frac{\frac{60!}{2!\cdot 58!}\cdot\frac{30!}{3!\cdot 27!}}{\frac{90!}{5!\cdot 85!}} = \frac{20650}{126291} \approx 0.16$$

Answer: $\frac{20650}{126291} \approx 0.16$.