Answer on Question #72630, Math / Statistics and Probability

A nationwide survey of 17,000 college seniors by the University of Michigan revealed that almost 70% disapprove of daily pot smoking. If 18 of these seniors are selected at random and asked their opinion, what is the probability that more than 9 but fewer than 14 disapprove of smoking pot daily?

Solution

Let N be the total number of senior students: $N = 17000$.
Let K be the number of senior students disapproving of daily pot smoking: $K = 17000 \cdot 0.70 = 11900$.
Let n be the number of senior students selected as sample: $n = 18$.
Let X be the random variable denotes the number of senior students disapproving of daily pot smoking among the sample of n students.
That is $X = 0, 1, 2, \dots, 18$.
Use the binomial distribution. We want to know $P(10 \leq X \leq 13)$.
From cumulative binomial tables

$$P(10 \leq X \leq 13) = P(X \leq 13) - P(X \leq 9) =$$

$$= \sum_{x=0}^{13} b(x; 18, 0.7) - \sum_{x=0}^{9} b(x; 18, 0.7) \approx 0.667345 - 0.059586 \approx 0.60776$$