Answer on Question # 41942– Math - Statistics and Probability

If 500 people each select a number a random between 1 and 100, what is the probability that 4 people select the number 25?

Solution:

A probability that one man select the number 25 ("success") is $p = \frac{1}{100} = 0.01$.

And the probability that 4 people select the number 25 is (using Bernoulli scheme)

$P_n(m) = C_n^m p^m (1-p)^{n-m}$, in our case n=100, m=4, $p = \frac{1}{100}$, hence

$$P_{100}(4) = C_{100}^4 \left(\frac{1}{100}\right)^4 \left(\frac{99}{100}\right)^{96} = \frac{100!}{4! * 96!}\left(\frac{1}{100}\right)^4 \left(\frac{99}{100}\right)^{96} = \frac{99 * 98 * 97}{4}\left(\frac{1}{100}\right)^3 \left(\frac{99}{100}\right)^{96}$$
$$= 0.08965028914$$

Answer: $P_{100}(4) = 0.08965028914$.