Answer on Question #83339 – Math – Statistics and Probability

Question

It is found that 40% of the first-year students are using a learner study system in one semester. Find the probability in a sample of 10 students, that exactly 5 use the learner study system.

Solution

The probability that out of *n* students exactly *k* use the learner study system is equal to

$$P_n(k) = \frac{n!}{k!(n-k)!} p^k (1-p)^{n-k},$$

where *p* is the probability that a randomly selected student uses the learner study system.

In our problem *n* = 10, *k* = 5, *p* = 0.4.

Thus,

$$P_{10}(5) = \frac{10!}{5!*(10-5)!} 0.4^5 (1-0.4)^{10-5} = \frac{10!}{5!*5!} 0.4^5 * 0.6^5 = 0.20066.$$

Answer:

The probability that in a sample of 10 students exactly 5 use the learner study system is equal to 0.20066.