Answer on Question #74855, Math / Statistics and Probability

Q. The probability that a student gets admission to a prestigious college is 0.3. If 5 students from the same school apply, what is the probability that at most 2 are accepted?

Solution:

To determine the probability of at most 2 students out of 5 will get accepted in collage, there is need to compute 3 individual probabilities by applying the following binomial formula:

$$P(x) = \frac{n!}{x!\,(n-x)!} P^x q^{n-x}$$

Where,

n = 5

P (probability of success) = 0.3

q = 1- P

The calculation of probability is as follows:

$$b(\times \leq 2; 5, 0.3) = b(\times = 0; 5, 0.3) + b(\times = 1; 5, 0.3) + b(\times = 2; 5, 0.3)$$

$$= \left[\frac{5!}{5!\,(5-0)!}(0.3)^0(1-0.3)^{5-0}\right] + \left[\frac{5!}{5!\,(5-1)!}(0.3)^1(1-0.3)^{5-1}\right]$$

$$+ \left[\frac{5!}{5!\,(5-2)!}(0.3)^2(1-0.3)^{5-2}\right]$$

$$= 0.1681 + 0.3601 + 0.3087$$

⇨ 0.8369

As per this, there is 83.69% probability that at most 2 students get accepted out of 5 applications.