Problem​ ​Statement​ ​1:

A test is conducted which is consisting of 20 MCQs (multiple choices questions) with

every MCQ having its four options out of which only one is correct. Determine the

probability that a person undertaking that test has answered exactly 5 questions wrong.

Problem Solution:

Formulae:

P (‘k’ successes in ‘n’ trials) = C(n,k)s^k(1−s)^(n−k)

Solution:

Here, n = 20, n - k = 5, k = 20 - 5 = 15

Here the probability of success = probability of giving a right answer = s = 1/4

Hence, the probability of failure = probability of giving a wrong answer = 1 - s

= 1 – 1/4 = 3/4

When we substitute these values in the formula for Binomial distribution we get,

So, P (exactly 5 out of 20 answers incorrect) = C (20, 5) \* (1/4)^15\* (3/4)^5

P (5 out of 20) = ((20∗19∗18∗17∗16)/(5∗4∗3∗2∗1)) \* (1/4)^15 \* (3/4)^5

= 0.0000034 (approximately)

Thus the required probability is 0.0000034 approximately.