**Problem Statement 1:**

A die marked A to E is rolled 50 times. Find the probability of getting a “D” exactly 5 times.

**Solution:**

Binomial probability distribution formulla is : n.c.k \* p^k \* (1-p)^(n-k)

where n is total number of trials/occurance

k is total number of success in n occurance

p is the probability of success In the given scenario,

n = 50 k = 5 p = (1/5) = 0.2 1-p = (1-1/5) = (4/5) = 0.8

n-k = 50-5 = 45

After substituting all the parameters in the binomial distribution formulla,

Probability of the getting a “D” exactly 5 times in a die can be calculated as below :

=> 50.c.5 \* (0.2)^5 \* (0.8)^45

=>(50\*49\*48\*47\*46/5\*4\*3\*2\*1) \* (0.2)^5 \* (0.8)^45

=> 254251200/120

=> 2118760 \* 0.00032 \* 0.00004356

=> 0.0295 approx

So probability of getting a “D” exactly 5 times with a die marked A to E which is rolled 50 times is : 0.0295 (approximately)