**STATISTICS 2**

**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.**

**Answer**

n = 20,

n - k = 5,

k = 20 - 5 = 15

Here the probability of success = probability of correct answer = s = 1/4

Hence, the probability of failure = probability of incorrect answer = 1 - s

= 1 – 1/4 = 3/4

Binomial theorem = C(n,k)\*s^(n-k)\*(1-s)^k

Substituting values in the above formula gives below

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

= 0.0000034

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

**times.**

n = 50,

k = 5,

n - k = 45.

Probability of success = probability of getting a “D”= s

= No. of D’s / Total choices

= 1/5

Probability of failure = probability of not getting a “D” = 1 - s = 4/5

Binomial theorem = C(n,k)\*s^(n-k)\*(1-s)^k

So, P (exactly 5 D’s out of 50) = C(50,5)\*(1/5)^45\*(4/5)^5

**Two balls are drawn at random in succession without replacement from an urn**

**containing 4 red balls and 6 black balls.**

**Find the probabilities of all the possible outcomes.**

We have total 10 balls of which 4 are red and 6 are black

We have four possibilities of which RR,RB,BR,BB, lets compute the probabilities of these events

Probability of RR = (4/10)(3/9) = 2/15

(We have 4/10 probability of choosing 4 red out of 10,second ball chance is 3 red out of 9 balls remaining since we are drawing balls without replacement reduces both numerator and denominator

Probabilities of remaining occurrences below

|  |
| --- |
| RB = (4/10)(6/9) = 4/15 |
| BR = (6/10)(4/9) = 4/15 |
| BB = (6/10)(5/9) = 1/3 |

The probability of 0 black balls (RR) is 2/15

The probability of 1 black ball is (RB or BR) is 4/15+4/15 = 8/15

The probability of 2 black balls (BB) is 1/3