Statistic Assignement

2.1. Problem Statement: STATISTICS 1

3. In a class on 100 students, 80 students passed in all subjects, 10 failed in one subject, 7 failed in two subjects and 3 failed in three subjects. Find the probability distribution of the variable for number of subjects a student from the given class has failed in.

For a random student,

The probability of failing in 0 subjects, P(X=0) = 0.8

The probability of failing in 1 subjects, P(X=1) = 0.1

The probability of failing in 2 subjects, P(X=2) = 0.07

The probability of failing in 3 subjects, P(X=3) = 0.03

The probability distribution can be shown as:

X	0	1	2	3
P(X)	0.8	0.1	0.07	0.03

2.2. Problem Statement: STATISTICS 2

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.

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

- The probability of success = probability of giving a right answer = s = 14
- The probability of failure = probability of giving a wrong answer = 1 - s = 1 - 14 = 34

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

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**

Thus the required probability is 0.0000034 approximately.

2. 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.

The probability of success = probability of getting a "D"= s = 1/5

The probability of failure = probability of not getting a "D" = 1 - s = 4/5.

3. 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.

First determine the probabilities of the events.

Events		Probability
RR	=	(4/10)(3/9) = 2/15
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 blue balls (RR) is 2/15
The probability of 1 blue ball is (RB or BR) is 4/15+4/15 = 8/15
The probability of 2 blue balls (BB) is 1/3

So the probability distribution is: Z   p(Z)
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0 = **2/15**
1 = **8/15**
2 = **1/3**