Problem Statement 1:

A company manufactures LED bulbs with a faulty rate of 30%. If I randomly select 6 chosen LEDs, what is the probability of having 2 faulty LEDs in my sample? Calculate the average value of this process. Also evaluate the standard deviation associated with it.

Solution:

p = Success = 0.3 ;q = Failure = 0.3

1. Calculate Mean

$\mu = E(x) = n \cdot p$

Where:

n = No. of Trials = 6

p = Success ration = 0.

Mean = 6*0.3= 1.8

1. Variance

Var = npq

Where:

n = No. of Trials = 6

p = Success ratio = 0.7

q = Failure ratio= 0.3

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    = 6*0.7*0.3

    = 1.26
```

1. Standard Deviation

$\sqrt{npq}$

Where:

n = No. of Trials = 6

p = Success ratio = 0.7

q = Failure ratio= 0.3

Standard Deviation = $\sqrt{6}0.70.3$

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            = 1.12
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Problem Statement 2:

Gaurav and Barakha are both preparing for entrance exams. Gaurav attempts to solve 8 questions per day with a correction rate of 75%, while Barakha averages around 12 questions per day with a correction rate of 45%. What is the probability that each of them will solve 5 questions correctly? What happens in cases of 4 and 6 correct solutions? What do you infer from it? What are the two main governing factors affecting their ability to solve questions correctly? Give a pictorial representation of the same to validate your answer.

Gaurav:

n = 8

p = 0.75

q = 0.25

Barakha:

n = 12

p = 0.45

q = 0.55

problem of each solving 5 questions correctly

p=G5.B5

=8c5(75)^5(25)^3.12c5(45)^5(55)^7

=0.212*0.214

=0.045

Problem of each solving 4 questions correctly

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=0.0896*0.1624

=0.0145
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Problem of each solving 6 questions correctly

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=0.3115*0.2124

=0.0661
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Probability is increasing with number of correct questions.

Problem Statement 3:

Customers arrive at a rate of 72 per hour to my shop. What is the probability of k customers arriving in 4 minutes? a) 5 customers, b) not more than 3 customers, c) more than 3 customers. Give a pictorial representation of the same to validate your answer.

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In [ ]:
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Problem Statement 4:

I work as a data analyst in Aeon Learning Pvt. Ltd. After analyzing data, I make reports, where I have the efficiency of entering 77 words per minute with 6 errors per hour. What is the probability that I will commit 2 errors in a 455-word financial report?

What happens when the no. of words increases/decreases (in case of 1000 words, 255 words)? How is the λ affected? How does it influence the PMF? Give a pictorial representation of the same to validate your answer.

Given Data,

77 words per minute

6 errors per hour

possibility of 2 errors in a 455 words

no.of words per hour=77*60

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                =4620
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  μ=errors in 455 words=6/4620*455
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                =0.59
```

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    p(2)=(e)^-0.59*(0.59)^2/2!
```

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        =0.0965
```

In case of 1000 words

μ=6/4620*1000

=1.3

p(2)=(e)^-1.3*(1.3)^2/2!

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    =0.23
```

In case of 255 words=0.04

Probability of error increase as the no of intervals increases.

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