**HW-1-GK**

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**HW-1-NT**

**Prob. 2.3**

**2.3 A** box contains 2000 computer cards. If five faulty cards are expected to be found in the box,

what is the probability of findiag two faulty cards in a sample of 250?

*Problem can be solved using either Binomial or Poisson Distribution, it will give you same answer.*

**Using poisson distribution :**



m = NP(x)= 250 x(5/2000)=0.625

 x= n=2

**PP-x=0.105**

**Using Bionomial Distribution:**

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Where N=250; n=2; p=5/2000=.0025

P B-x= 250!x (.0025)2x (1-0.0025)248/(2!x248!)

 = 0.104

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Average length m = Σfx, where f is frequency of occurrence of x and standard deviation σ= √Σ (x-m)2/N-1

Make a frequency table with column x, f, fx, (x-m)2 and get the values m=2.609; σ=0.021



Use Gaussian integral probability to calculate PG(x<14X103 kg/m3)

μ=17X103 kg/m3 ; σ = 103 kg/m3

x=14x103 kg/m3= μ-kσ ; k= x-μ /σ = -3

PG(x<-3σ)= [1- Area(P(μ ± 3σ)]/2=0.00135

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Make a Table to calculate average value m and σ of x ; m= Σfx=107.9, where f is frequency of occurrence of x and standard deviation σ= √Σ (x-m)2/N-1= 14.02

Calculate the separation between each selected event from the mean μ in terms of σ and calculate the probability using the Gaussian table.

Finally calculate the number of events by multiplying the probability with total events. If the number obtained is less than 0.5 , reject it. Recalculate m and σ for new data sets and selecte the second outlier events and test them for rejection till you find non-rejectable events. Rejectable events are 151, 75.

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For a normally standard distribution of data :



Confidence limit = 1-P(t>k)

**xa=xn+tσ; xn=2.609 and σ=0.02; confidence limit=99.4 %(P(t>2.5)**

**xa=xn+tσ=2.609+2.5x0.02=2.659**