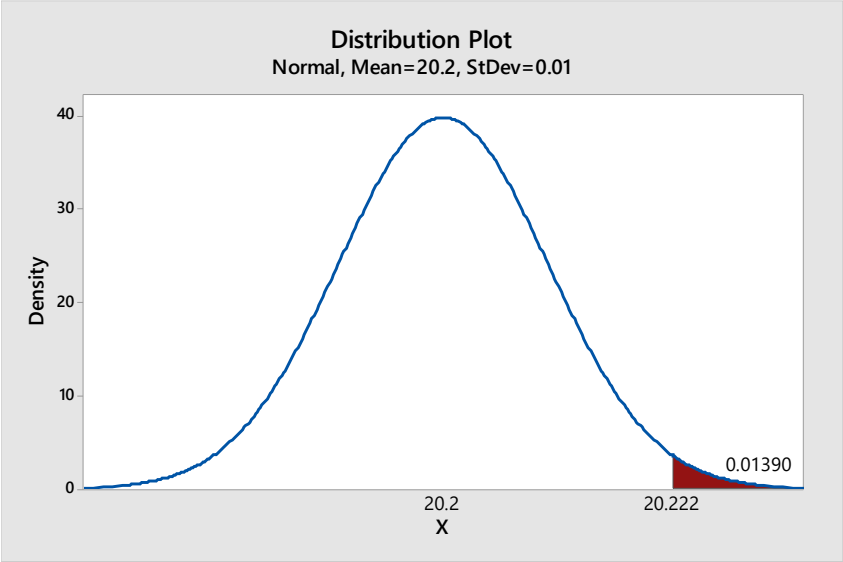
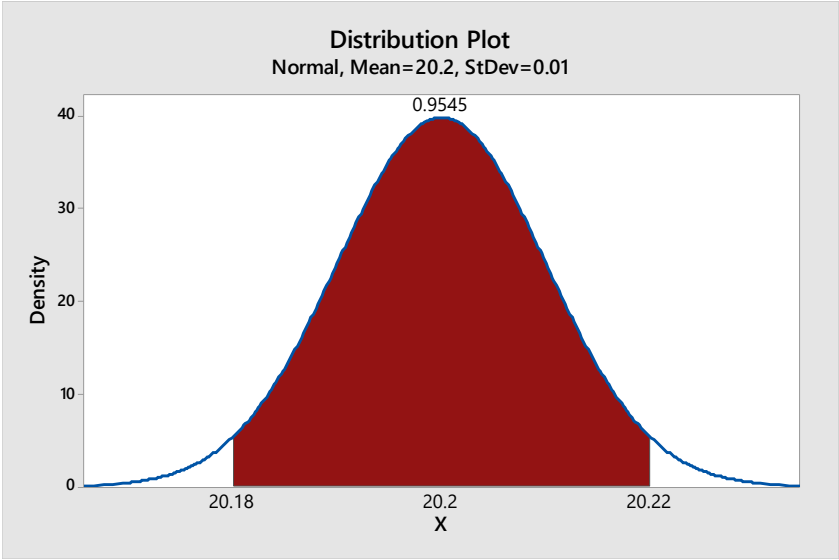
Finding Probabilities

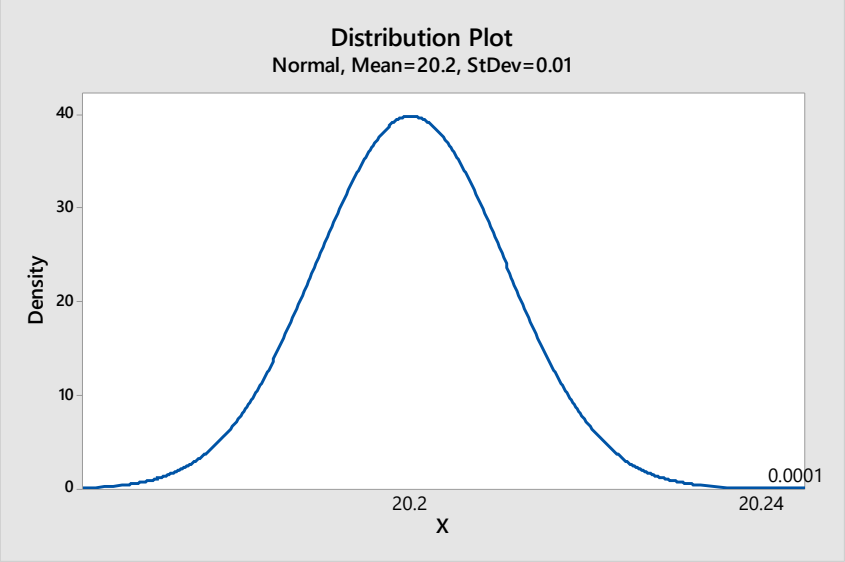
1. A critical dimension was produced in a particular machining station. Data collected from the samples had Mean = 20.2 ; SD=0.01
    a. If 20.222 is USL, what % is likely to be rejected



    b. For a trial batch, you want only components with dimensions between 20.18 & 20.22. What % of components are you likely to get?



    c. If wish to have 99.9% acceptable rate from this process, what should be USL?



Binomial Distribution

2. There is 1% probability of detecting an error in a transaction by the checker (inspector) in transaction processing team. Every day 150 transactions are processed.
    a. Quality Head wants to the probability that there will be any errors in a given day?

Probability Density Function

Binomial with n = 150 and p = 0.01

x	P(X = x)
0	0.221452

Probability of Any Errors = 1 – Probability(No errors)

= 1 -0.221452 = 0.77855

    b. What is the probability of 2 or more errors in a given day?

Cumulative Distribution Function

Binomial with n = 150 and p = 0.01

x	P(X ≤ x)
1	0.556985

Identifying Distributions

3. The data for installation of broad band services at customer location is collected. Based on the data, identify the respective distribution for each of the parameter**. (Source: Distribution_Telecom data_Practicefile)**

Installation TAT in Hours	3 Parameter Weibull
Commission to SA	3 Parameter Weibull
No. of installations requests in queue	3 Parameter Weibull
Prcessing Time@ Back Office	Normal (Visual Fit)
Distance from the SA office	Logistic
Distance travelled	Logistic
Installation Time by SA	3 Parameter Weibull

Poisson Distribution

4. The "No of installations in queue" is measured hourly (so every data point is per hour data) in attached file. **(Source: Distribution_Telecom data_Practicefile).** What is the probability that there will be 17 installations in queue in any given hour?

Probability Density Function

Poisson with mean = 10.256

x	P(X = x)
17	0.0151857

a. What is the probability that there will be just 3 installations in queue?

Probability Density Function

Poisson with mean = 10.256

x	P(X = x)
3	0.0063191

b. If you were to create capacity of the downstream process based on the number of installations in queue, at 95% how many installations should be serviced by downstream process to attain nearly a single piece flow (no waiting)?

For 17, the probability is greater than 96.7%. At 95%, the capacity is a decimal as this is a discrete distribution. Hence 17 is the answer.