Machine A	Machine B
25.9	29.6
20.7	29.2
21.6	31.6
26.3	29.6
27.7	34.9
22.9	30.1
22.0	28.5
24.4	25.9
26.0	32.1
21.4	26.8
25.4	29.5
25.9	26.6
24.3	22.1
23.4	29.8
26.3	22.2
23.1	20.6
25.6	29.2
23.4	32.3
25.9	33.3
28.0	26.5
24.8	27.5
26.2	26.3
24.9	24.7
25.2	29.0
28.8	31.6
26.0	32.3
26.2	33.3
27.2	25.7
25.5	26.6
22.3	31.3

1. A process consists of two machines that make the same chemical and run at the same time. An industrial engineer has sampled the machines' output in gallons per hour, and recorded her findings in columns A and B. Calculate the following statistics for each machine:

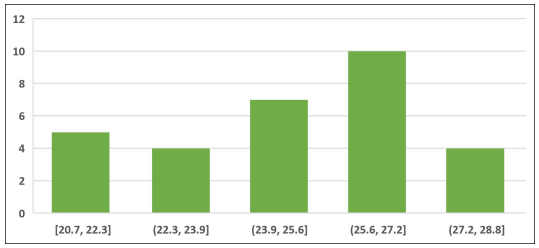
	Machine A	Machine B
Maximum Observed	28.8	34.9
Minimum Observed	20.7	20.6
Observed Range	8.1	14.3
Median	25.5	29.2
Interquartile Range	2.75	5

2. Assuming the data are normally distributed, calulcate the following statistics:

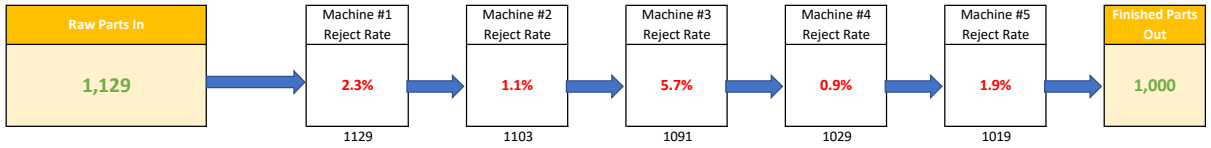
	Machine A	Machine B
Arithmetic Average	24.9	28.6
Sample Standard Deviation	2.0	3.5
Max Expected Value	31.0	39.1
Min Expected Value	18.8	18.1
60% of the values are expected to fall below what production rate?	25.4	29.5

Assume Max and Min values that capture 99.7% of the population

3. Construct a histogram below with 5 bins for the Machine A output data:



5. Assume you have a process consisting of 5 machines in a series (i.e. parts flow out of machine #1 into machine #2, then out of machine #2 into machine #3, etc.) Each machine has a reject rate identified below. You need 1,000 finished parts out of Machine #5. How many parts need to start the process into Machine #1 to produce the 1,000 parts?



	Machine A	Machine B
Quartile 4	28.8	34.9
Quartile 3	26.15	31.525
Quartile 2	25.45	29.2
Quartile 1	23.4	26.525
Quartile 0	20.7	20.6

4. What is the artithmetic average and sample standard deviation for combined gallons per hour output of both machines?

	Entire Process
Arithmetic Average	53.5
Sample Standard Deviation	4.05