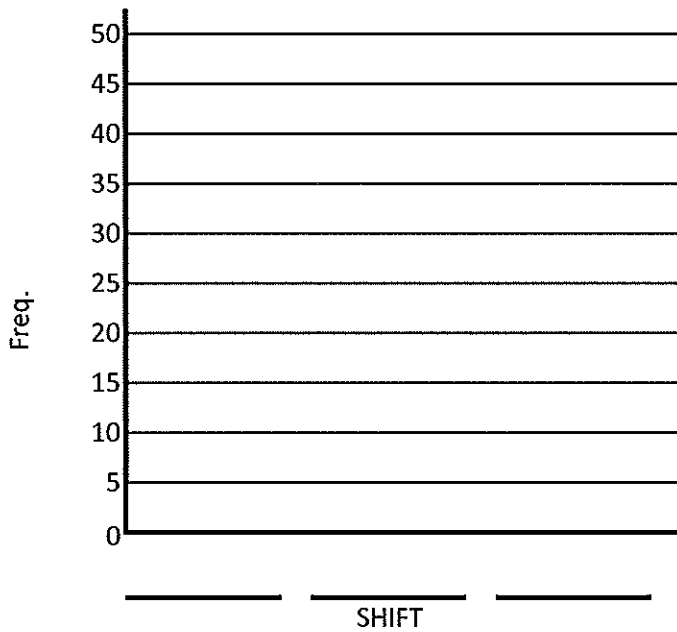


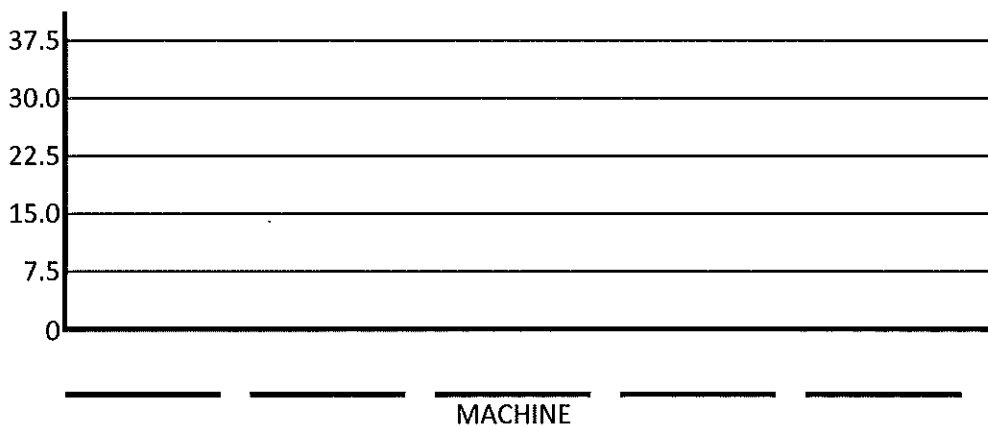
1. (20 points) The following data table depicts the number of defects made by different shifts and machines in a manufacturing plant for a week.

Defects	Machine					Totals
	Slitter	Blanker	Main Press	Trim Press	Packaging	
1st	6	8	11	12	4	41
2nd	12	16	8	12	2	
3rd	10	9	5	12	0	
Totals	28	33			6	

a) Make a pareto chart of defects by shift.



b) Make a pareto chart of defects by machine.



FROM ANALYZING YOUR CHARTS...

c) What are the two worst shifts and their combined % of the total?

#1 _____
#2 _____ %

d) What are the two worst machines and their combined % of the total?

#1 _____
#2 _____ %

e) Are there any combinations of Shift and Dept that have higher than average defects?
If so, list them.

TEST 1

ENGT 3010-003
Spring 2019

NAME: _____

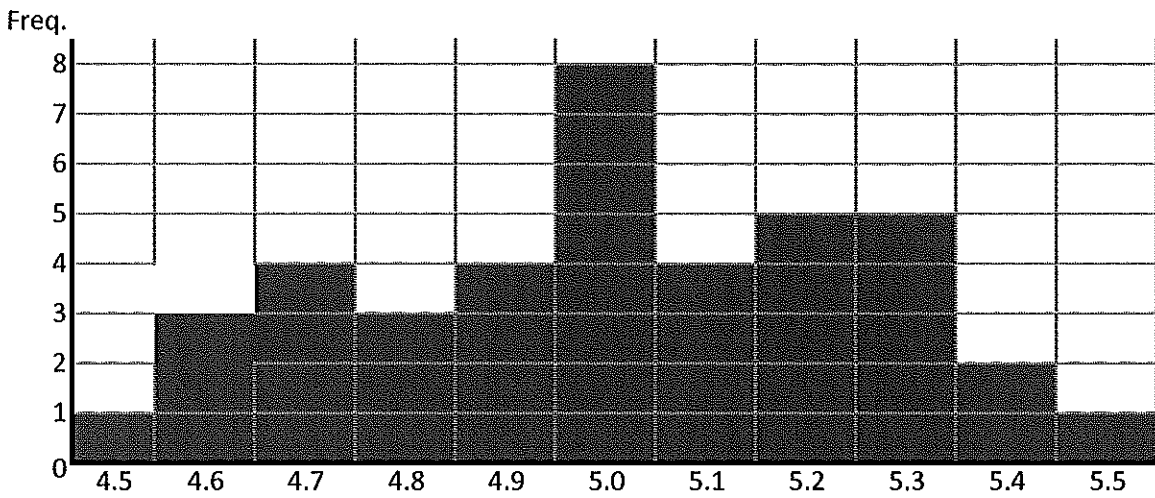
Total

2. (20 points) The following data table depicts the lengths of a particular part made at a company.

Characteristic: Length (mm)

4.9	4.6	5.0	5.0	4.8	5.2	4.9	5.1	4.7	4.8	5.1
5.2	4.7	5.2	4.9	4.5	5.0	5.3	5.0	5.2	4.6	5.2
4.9	5.1	5.0	5.2	4.7	4.8	5.1	5.1	4.7	4.6	4.9
5.3	5.0	5.3	5.5	5.0	5.3	5.3	5.4	5.0	5.4	5.3

a) Finish the histogram below by adding the shaded data points to the graph below.



a) what is the range of the sample data?

Range = _____

b) Given that the data sums to 220.3 , what is the mean (average) length?

c) How would you characterize this distribution?
(Normal, skewed, bimodal, etc.)?

3. (20 points) The scrap percentage of a particular company's product is 6%, even though they inspect every part before shipment. They are about to ship a large order of 5000 pieces.

- a) Calculate the expected number of defective parts $E(x)$ and the standard deviation σ of this shipment.
(Note: we are using the normal approximation to the binomial)

b) What is the probability that this shipment contains 500 or less defective parts?

c) Based on your results from b) above, do you expect a call from your customer

YES _____

NO _____

4. (20 points) A machine fills 24-ounce (according to the label) boxes with cereal. The amount deposited into the box is normally distributed with a standard deviation of 0.50 ounce. The lower limit of weight for the box is 23.5 ounces.

- a) If the process is averaging exactly 24.0 ounces, what is the probability that a part will weigh less than 23.5 ounces?

5. (20 points) For the same machine in problem 4. above,

- a) If the process average is increased to 25.0 ounces, what percentage of product will be less than 23.5 ounces?