HOMEWORK #02

6.1. An avant-garde clothing manufacturer runs a series of high-profile, risque ads on a billboard on Highway 101 and regularly collects protest calls from people who are offended by them. The company has no idea how many people in total see the ad, but it has been collecting statistics on the number of phone calls from irate viewers:

Type	Description	Number of Complaints
R	Offensive racially/ethnically	10
M	Demeaning to men	4
W	Demeaning to women	14
I	Ad is Incomprehensible	6
O	Other	2

a) Depict this data with a Pareto chart. Also depict the cumulative complaint line.
b) What percent of the total complaints can be attributed to the most prevalent complaint?

6.2 Develop a scatter diagram for two variables of interest (say pages in the newspaper by day of the week).

6.3 Develop a Pareto chart of the following causes of poor grades on an exam

Reason for Poor Grade	Frequiency
Insufficient time to complete	15
Late arrival to exam	7
Difficulty understanding material	25
Insufficient preparation time	2
Studied wrong material	2
Distractions in exam room	9
Calculator batteries died during exam	1
Forgot exam was scheduled	3
Felt ill during exam	4

6.4 Develop a histogram of the time it took for you or your friends to receive six recent orders at a fast-food restaurant.

6.5 Theresa Shotwell's restaurant in Tallahassee, Florida, has recorded the following data for eight recent customers has recorded the following data for eight recent customers:

Customer Number, *i*	Minutes from Time Food Ordered Until Food Arrived (y_i)	No. of Trips to Kitchen by Waitress (x_i)
1	10.50	4
2	12.75	5
3	9.25	3
4	8.00	2
5	9.75	3
6	11.00	4
7	14.00	6
8	10.75	5

a. Theresa wants you to graph the eight points (x_i, y_i), i = 1, 2, . . . 8. She has been concerned because customers have been waiting too long for their food, and this graph is intended to help her find possible causes of the problem.
b. This is an example of what type of graph?

6.6 Develop a flowchart showing all the steps involved in planning a party

6.7 Consider the types of poor driving habits that might occur at a traffic light. Make a list of the 10 you consider most likely to happen. Add the category of "other" to that list

a) Compose a check sheet to collect the frequency of occurrence of these habits. Using your check sheet, visit a busy traffic light intersection at four different times of the day, with two of these times being during high-traffic periods (rush hour, lunch hour). For 15 to 20 minutes each visit, observe the frequency with which the habits you listed occurred.
b) Construct a Pareto chart showing the relative frequency of occurrence of each habit.

6.8 Draw a fish-bone chart detailing reasons why an airline customer might be dissatisfied.

6.9 Consider the everyday task of getting to work on time or arriving at your first class on time in the morning. Draw a fish-bone chart showing reasons why you might arrive late in the morning.

6.10 Construct a cause-and-effect diagram to reflect "student dissatisfied with university registration process." Use the "four Ms" or create your own organizing scheme. Include at least 12 causes.

6.11 Draw a fish-bone chart depicting the reasons that mightgive rise to an incorrect fee statement at the time you go to pay for your registration at school.

6.12 Mary Beth Marrs, the manager of an apartment complex, feels overwhelmed by the number of complaints she is receiving. Below is the check sheet she has kept for the past 12 weeks. Develop a Pareto chart using this information. What recommendations would you make?

Week	Grounds	Parking/ Drives	Pool	Tenant Issues	Electrical/ Plumbing
1	√√√	√√	√	√√√	
2	√	√√√	√√	√√	√
3	√√√	√√√	√√	√	
4	√	√√√√	√	√	√√
5	√√	√√√	√√√√	√√	
6	√	√√√√	√√		
7		√√√	√√	√√	
8	√	√√√√	√√	√√√	√
9	√	√√	√		
10	√	√√√√	√√	√√	
11		√√√	√√	√	
12	√√	√√√	√√√	√	

6.13 Use Pareto analysis to investigate the following data collected on a printed-circuit-board assembly line:

Defect	Number of Defect Occurrences
Components not adhering	143
Excess adhesive	71
Misplaced transistors	601
Defective board dimension	146
Mounting holes improperly positioned	12
Circuitry problems on final test	90
Wrong component	212

a) Prepare a graph of the data.
b) What conclusions do you reach?

6.14 A list of 16 issues that led to incorrect formulations in Richard Dulski's jam manufacturing unit is provided below:

List of Issues

1. Incorrect measurement	9. Variability
2. Antiquated scales	10. Equipment in disrepair
3. Lack of clear instructions	11. Technician calculation off
4. Damaged raw material	12. Jars mislabeled
5. Operator misreads display	13. Temperature controls off
6. Inadequate cleanup	14. Incorrect weights
7. Incorrect maintenance	15. Priority miscommunication
8. Inadequate flow controls	16. Inadequate instructions

Create a fish-bone diagram and categorize each of these issues correctly, using the "four *M*s" method

6.15 Develop a flowchart for one of the following:

a) Filling up with gasoline at a self-serve station.

b) Determining your account balance and making a withdrawal at an ATM.

c) Getting a cone of yogurt or ice cream from an ice cream store.

6.16 Boston Electric Generators has been getting many complaints from its major customer, Home Station, about the quality of its shipments of home generators. Daniel Shimshak, the plant manager, is alarmed that a customer is providing him with the only information the company has on shipment quality. He decides to collect information on defective shipments through a form he has asked his drivers to complete on arrival at customers' stores. The forms for the first 279 shipments have been turned in. They show the following over the past weeks:

Week	No. of Ship-ments	No. of Ship-Ments With Defects	*Reason for Defective Shipment*			
			Incorrect Bill of Lading	Incorrect Truck-load	Damaged Product	Trucks Late
1	23	5	2	2	1	
2	31	8	1	4	1	2
3	28	6	2	3	1	
4	37	11	4	4	1	2
5	35	10	3	4	2	1
6	40	14	5	6	3	
7	41	12	3	5	3	1
8	44	15	4	7	2	2

Even though Daniel increased his capacity by adding more workers to his normal contingent of 30, he knew that for many weeks he exceeded his regular output of 30 shipments per week. A review of his turnover over the past 8 weeks shows the following:

Week	No. of New Hires	No. of Terminations	Total No. of Workers
1	1	0	30
2	2	1	31
3	3	2	32
4	2	0	34
5	2	2	34
6	2	4	32
7	4	1	35
8	3	2	36

a. Develop a scatter diagram using total number of shipments and number of defective shipments. Does there appear to be any relationship?
b. Develop a scatter diagram using the variable "turnover" (number of new hires plus number of terminations) and the number of defective shipments. Does the diagram depict a relationship between the two variables?
c. Develop a Pareto chart for the type of defects that have occurred.
d. Draw a fish-bone chart showing the possible causes of the defective shipments.

6.17 A recent Gallup poll of 519 adults who flew in the past year (published in *The Economist,* June 16, 2007, p. 6) found the following their number 1 complaints about flying: cramped seats (45), cost (16), dislike or fear of flying (57), security measures (119), poor service (12), connecting flight problems (8), overcrowded planes (42), late planes/waits (57), food (7), lost luggage (7), and other (51).

a. What percentage of those surveyed found nothing they disliked?
b. Draw a Pareto chart summarizing these responses. Include the "no complaints" group.
c. Use the "four *M*s" method to create a fish-bone diagram for the 10 specific categories of dislikes (exclude "other" and "no complaints").
d. If you were managing an airline, what two or three specific issues would you tackle to improve customer service? Why?