Lesson 13 Introduction to Quality Solutions

Solved Problem #1: see textbook

The following problems should be done manually and graphs should be to an appropriate scale.

#1: The following is a list of work done by an automobile service shop.

Ticket No.	Work		Ticket No.	Work
1	Tires		16	Tires
2	Lube & oil		17	Lube & oil
3	Tires		18	Brakes
4	Battery		19	Tires
5	Lube & oil		20	Brakes
6	Lube & oil		21	Lube & oil
7	Lube & oil		22	Brakes
8	Brakes		23	Transmission
9	Lube & oil		24	Brakes
10	Tires		25	Lube & oil
11	Brakes		26	Battery
12	Lube & oil		27	Lube & oil
13	Battery		28	Battery
14	Lube & oil		29	Brakes
15	Lube & oil		30	Tires

a. Prepare a check sheet showing the number of times each type of work was performed?

Work	# Times
Tires	6
Lube & Oil	12
Battery	4
Brakes	7
Transmission	1
Total	30

b. Prepare a Pareto diagram for the type of work performed?

Automobile Shop Service Work
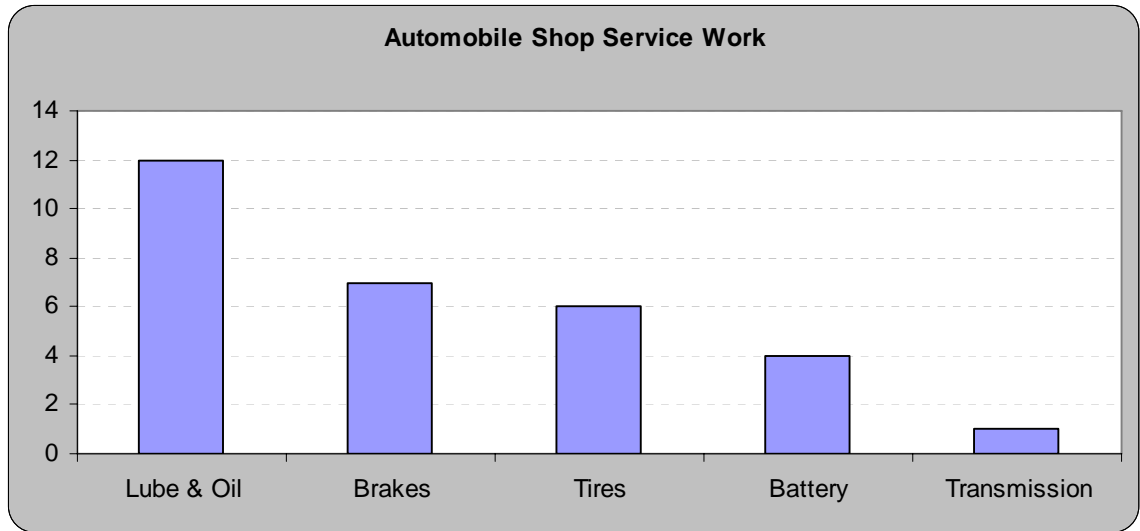
#2: An air conditioning repair department manager has compiled data on the primary reason for 41 service calls for the previous week as shown in the table below.

Job Number	Problem	Customer Type	Job Number	Problem	Customer Type
301	F	R	322	O	R
302	O	R	323	F	R
303	N	C	324	N	C
304	N	R	325	F	R
305	W	C	326	O	R
306	N	R	327	W	C
307	F	R	328	O	C
308	N	C	329	O	C
309	W	R	330	N	R
310	N	R	331	N	R
311	N	R	332	W	R
312	F	C	333	O	R
313	N	R	334	O	C
314	W	C	335	N	R
315	F	R	336	W	R
316	O	C	337	O	C
317	W	C	338	O	R
318	N	C	339	F	R
319	O	C	340	N	R
320	F	R	341	O	C
321	F	R			

Key:

	Problem Type		Customer Type
N	Noisy	C	Commercial customer
F	Equip. Failure	R	Residential customer
W	Runs warm		
O	Odor		

a. Prepare a check sheet showing the repair problem type?

Problem Type	# Times
Noisy	13
Equip. Failure	9
Runs warm	7
Odor	12
Total	41

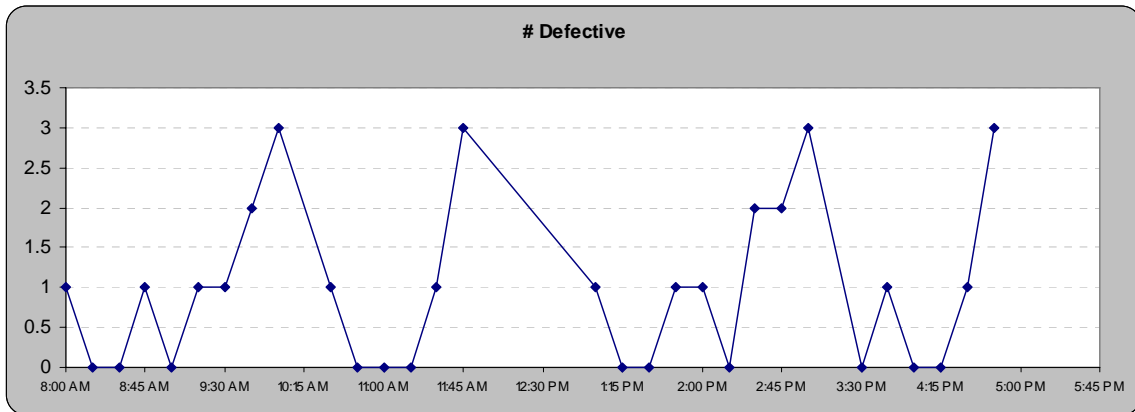b. Prepare a Pareto diagram for the repair problem type?
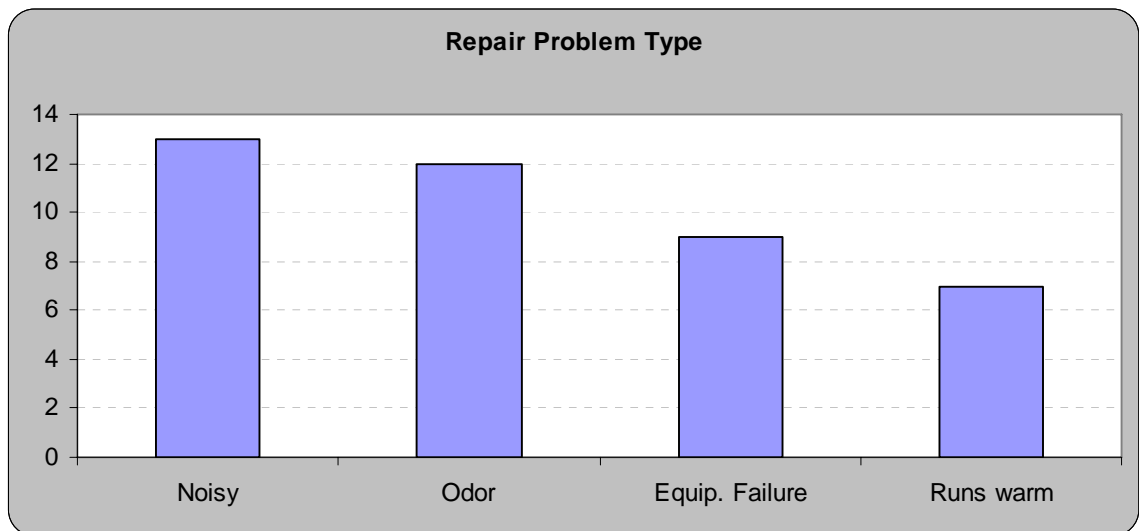
#3: The number defective by time for a company which produces computer monitors was obtained by an analyst who observed the number of defectives through out the work day. The work day begins at 8:00am and ends at 5:00pm. Workers are given a 15-minute break at 10:15am, and 3:15pm. Lunch is at 12:00noon. The data is in the table below.

Time	# Defective	Time	# Defective
8:00 AM	1	1:00 PM	1
8:15 AM	0	1:15 PM	0
8:30 AM	0	1:30 PM	0
8:45 AM	1	1:45 PM	1
9:00 AM	0	2:00 PM	1
9:15 AM	1	2:15 PM	0
9:30 AM	1	2:30 PM	2
9:45 AM	2	2:45 PM	2
10:00 AM	3	3:00 PM	3
10:30 AM	1	3:30 PM	0
10:45 AM	0	3:45 PM	1
11:00 AM	0	4:00 PM	0
11:15 AM	0	4:15 PM	0
11:30 AM	1	4:30 PM	1
11:45 AM	3	4:45 PM	3

a. Prepare a run chart showing the number of defectives by time?

b. What can you conclude?

Defects are highest just before breaks, lunch, and quitting time.

#4: In the following table are the calls that were recorded for an emergency 911 call between 1:00am and 2:30am. As you can see more than one call can occur in any given minute. Three operators were on call on this particular night.

Call	Time	Call	Time
1	1:03	22	1:56
2	1:06	23	1:56
3	1:09	24	2:00
4	1:11	25	2:00
5	1:12	26	2:01
6	1:17	27	2:02
7	1:21	28	2:03
8	1:27	29	2:03
9	1:28	30	2:04
10	1:29	31	2:06
11	1:31	32	2:07
12	1:36	33	2:08
13	1:39	34	2:08
14	1:42	35	2:11
15	1:43	36	2:12
16	1:44	37	2:12
17	1:47	38	2:13
18	1:48	39	2:14
19	1:50	40	2:14
20	1:52	41	2:16
21	1:53	42	2:19

a. Prepare a check sheet showing the number of calls in each 15 minute interval?

Time Interval		# Calls
1:00	1:15	**5**
1:15	1:30	**5**
1:30	1:45	**6**
1:45	2:00	**9**
2:00	2:15	**15**
2:15	2:30	**2**
	Total	**42**

b. Based on this information, do you feel the three operators were sufficient to handle the call volume?

There were 15 calls between 2:00am and 2:15. If the length of each call was more than 3 minutes each, then the 3 operators would have been insufficient to answer the calls in a timely manner.

#5: Prepare a simple cause-and-effect (Ishikawa) diagram to analyze the possible causes for a table lamp fails when turned on.

#6: The human resources manager wants to determine if there is a relationship between age and absenteeism. She takes a random sample of several employees with different ages and records their absences. The sample results are shown below:

Age	Absences
24	6
30	5
22	7
25	6
33	4
27	5
36	4
58	1
37	3
47	2
54	2

a. Prepare an XY scatter diagram of the results? Use Age on the X-axis and Absences on the Y-axis.

Absences by Age
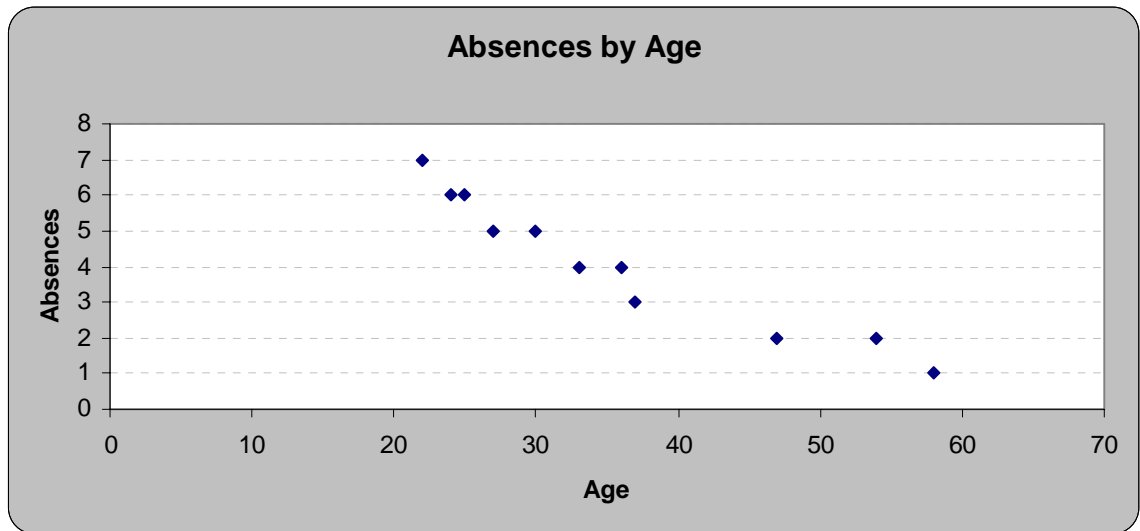
b. Generalize your observations?

Younger people are absent more often than older people.