Anshika 102003183 3COE8

Assignment-1

Ques 1 Absorbency of towels →

18.71	21.41	20.72	21.81	19.29	22.43
20.17	23.71	19.44	20.50	18.92	20.33
23.00	22.85	19.25	21.77	22.11	19.77
18.04	21.12				

$\Sigma x_i = 415.35$

$n = 20$

(a) Mean $= \frac{\Sigma x_i}{n} = \frac{415.35}{20} = 20.76\,75$

for median we need to sort the data,

18.04	18.71	18.92	19.25	19.29	19.44	19.77
20.17	20.33	20.50	20.72	21.12	21.41	21.77
21.81	22.11	22.43	22.85	23.00	23.71	

Median $= \frac{(n/2)^{th}\text{ term} + (n/2+1)^{th}\text{ term}}{2}$

$= \frac{20.50 + 20.72}{2} = 20.61$

(b) For 10% trimmed mean, we will omit 10% largest and 10% smallest values from the sample.

18.92	19.25	19.29	19.44	19.77	20.17	20.33	20.50
20.72	21.12	21.41	21.77	21.81	22.11	22.43	22.85

Now $\Sigma x_i = 331.89$, $n = 16$

Mean $= \frac{331.89}{16} = 20.743125$

(c) Using, the value of median, we cannot say anything about the outliers as it is least affected by them. As the trimmed mean is almost equal to mean, we can say, there are no outliers in the data as mean is affected by extreme values.

Ques 2: Product 1:

9.3 8.8 6.8 8.7 8.5 6.7 8.0 6.5 9.2 7.0

Product 2:

11.0 9.8 9.9 10.2 10.1 9.7 11.0 11.1 10.2 9.6

(a) For Product 1:

$\Sigma x_i = 79.5$ $\quad n = 10$

$$\text{Mean} = \frac{79.5}{10} = 7.95$$

Sorted data :-

6.5 6.7 6.8 7.0 8.0 8.5 8.7 8.8 9.2 9.3

$$\text{Median} = \frac{8.0 + 8.5}{2} = 8.25$$

For Product 2:

$\Sigma x_i = 102.6$ $\quad n = 10$

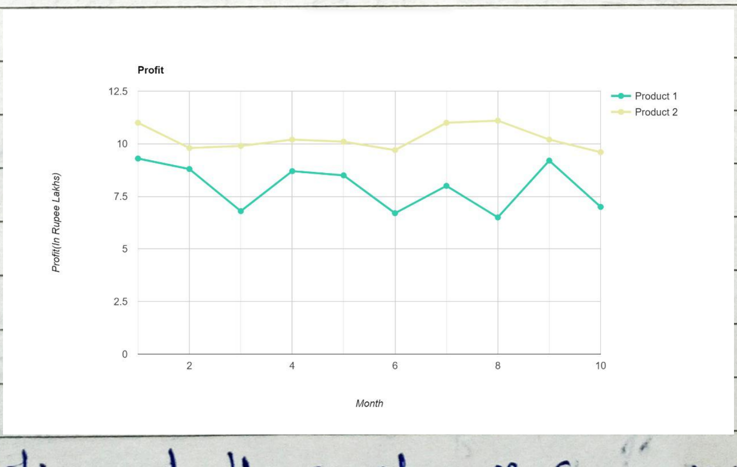
$$\text{Mean} = \frac{102.6}{10} = 10.26$$

Sorted data:-

9.6 9.7 9.8 9.9 10.1 10.2 10.2 11.0 11.0 11.1

$$\text{Median} = \frac{10.1 + 10.2}{2} = 10.15$$

(b)



By looking at the graph, we can say that product 2 is more popular as it generates more profit.

(c) Product 1:

x_i	$(x_i-\bar{x})$	$(x_i-\bar{x})^2$
9.3	1.35	1.8225
8.8	0.85	0.7225
6.8	-1.15	1.3225
8.7	0.75	0.5625
8.5	0.55	0.3025
6.7	-1.25	1.5625
8.0	0.05	0.0025
6.5	-1.45	2.1025
9.2	1.25	1.5625
7.0	-0.95	0.9025
		10.865

Product 2:

x_i	$(x_i-\bar{x})$	$(x_i-\bar{x})^2$
11.0	0.74	0.5476
9.8	-0.46	0.2116
9.9	-0.36	0.1296
10.2	-0.06	0.0036
10.1	-0.16	0.0256
9.7	-0.56	0.3136
11.0	0.74	0.5476
11.1	0.84	0.7056
10.2	-0.06	0.0036
9.6	-0.66	0.4356
		2.924

Product 1:

$$\text{Variance} = \frac{\Sigma(x_i-\bar{x})^2}{n}$$

$$= \frac{10.865}{10}$$

$$= 1.0865$$

$$\text{S.D.}\ (\sigma) = \sqrt{\text{Variance}} = \sqrt{1.0865}$$

$$= 1.042$$

$$\text{C.V} = \frac{\sigma}{\bar{x}} \times 100$$

$$= \frac{1.042}{7.95} \times 100$$

$$= 13.11\%$$

Product 2:

$$\text{Variance} = \frac{\Sigma(x_i-\bar{x})^2}{n}$$

$$= \frac{2.924}{10}$$

$$= 0.2924$$

$$\text{S.D.}\ (\sigma) = \sqrt{\text{Variance}} = \sqrt{0.2924}$$

$$= 0.541$$

$$\text{C.V} = \frac{\sigma}{\bar{x}} \times 100$$

$$= \frac{0.541}{10.15} \times 100$$

$$= 5.33\%$$

Ques 3 →

Given mean = 209.90

$n = 10$

Σx_i = Given mean × n

= 209.90 × 10 = 2099

Correct Σx_i = Σx_i − Incorrect value + Correct value

= 2099 − 221 + 250

= 2128

Correct mean = $\frac{2128}{10}$ = 212.8

Ques 4 →

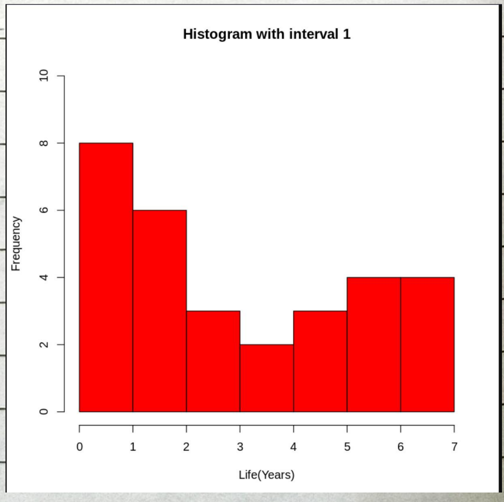
(a)

Stem	Leaf
0	2 2 2 3 3 4 5 7
1	0 2 3 5 5 8
2	0 3 5
3	0 3
4	0 5 7
5	0 5 6 9
6	0 0 0 5

$\boxed{0|2 - 0.2}$

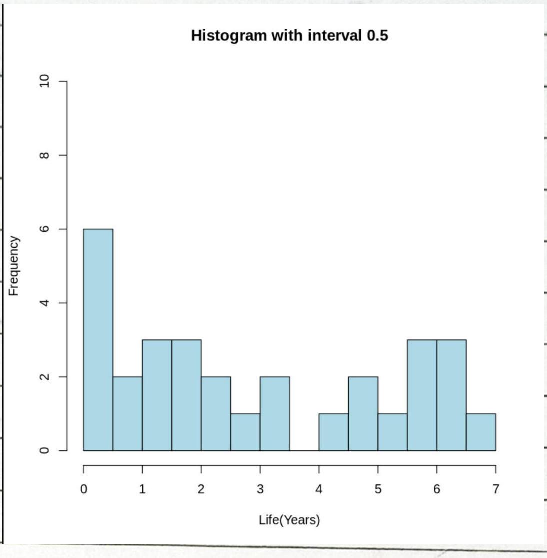
(b)

C.I.	f	R.f.
0−1	8	0.27
1−2	6	0.20
2−3	3	0.10
3−4	2	0.07
4−5	3	0.10
5−6	4	0.13
6−7	4	0.13
	30	



(c)

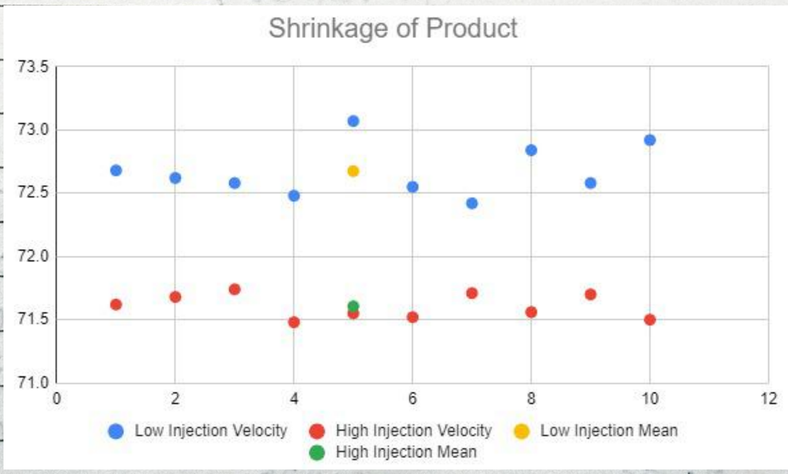
C.I.	f	R.f.
0-0.5	6	0.20
0.5-1.0	2	0.07
1.0-1.5	3	0.10
1.5-2.0	3	0.10
2.0-2.5	2	0.07
2.5-3.0	1	0.03
3.0-3.5	2	0.07
3.5-4.0	0	0.00
4.0-4.5	1	0.03
4.5-5.0	2	0.07
5.0-5.5	1	0.03
5.5-6.0	3	0.10
6.0-6.5	3	0.10
6.5-7.0	1	0.03
	30	



(d) The interval should not be very large and also not very small to observe pattern in the data.

Ques 5 →

(a)



(b) Low injection velocity

x_i	$(x_i-\bar{x})$	$(x_i-\bar{x})^2$
72.68	0.006	0.000036
72.62	-0.054	0.002916
72.58	-0.094	0.008836
72.48	-0.194	0.037636
73.07	0.396	0.156816
72.55	-0.124	0.015376
72.42	-0.254	0.064516
72.84	0.166	0.027556
72.58	-0.094	0.008836
72.92	0.246	0.060516

$$\bar{x} = \frac{\Sigma x_i}{n} = \frac{726.74}{10} = 72.674$$

$$\text{Variance}, \sigma^2 = \frac{\Sigma(x_i-\bar{x})^2}{n}$$

$$= \frac{0.38304}{10} = 0.038304$$

$$\text{S.D.}, \sigma = \sqrt{\text{Variance}}$$

$$= \sqrt{0.038304}$$

$$= 0.196$$

High injection velocity

x_i	$(x_i-\bar{x})$	$(x_i-\bar{x})^2$
71.62	0.014	0.000196
71.68	0.074	0.005476
71.74	0.134	0.017956
71.48	-0.126	0.015876
71.55	-0.056	0.003136

71.52	-0.086	0.007396
71.71	0.104	0.010816
71.56	-0.046	0.002116
71.70	0.094	0.008836
71.50	-0.106	0.011236

$$\bar{x} = \frac{\Sigma x_i}{n} = \frac{716.06}{10} = 71.606$$

$$\text{Variance, } \sigma^2 = \frac{\Sigma (x_i - \bar{x})^2}{n}$$

$$= \frac{0.08304}{10} = 0.008304$$

$$\text{S.D., } \sigma = \sqrt{\text{Variance}}$$

$$= \sqrt{0.008304}$$

$$= 0.091$$

(C) As we can see from the graph, mean for higher injection velocity is low so we can say it is inversely proportional.