

ASSIGNMENT # 1

PROBABILITY AND STATISTICS

Name: Talha Tahir

Roll no: 2IL-5270

Section: 4K

QUESTIONS:

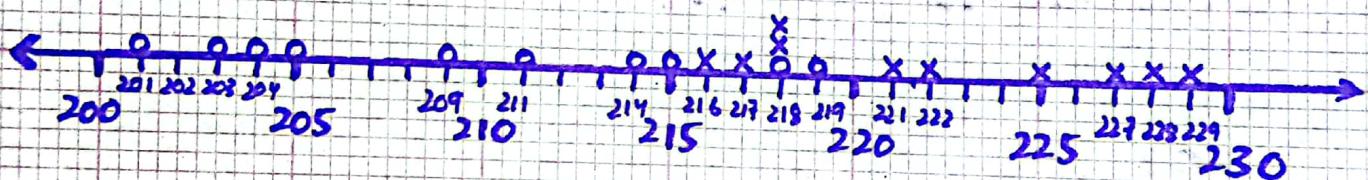
1-3, 1-4, 1-21, 1-30, Histogram

Q:-

1.3

(a)

Dot plot of Data :-



"X" represents non-aging

"O" represents aging

Date: _____

Day: _____

(b)

Yes, tensile strength will be decreased due to aging process.

(c)

$$\text{Mean}_{\text{aging}} = \frac{219 + 214 + 215 + 211 + 209 + 218 + 203 + 204 + 201 + 205}{10}$$

$$= 209.90$$

$$\text{Mean}_{\text{no-aging}} = \frac{227 + 222 + 218 + 217 + 225 + 218 + 216 + 229 + 228 + 221}{10}$$

$$= 222.10$$

(d)

Median_{aging} = ? , Median_{no-aging} = ?

Sorted data of aging :

201, 203, 204, 205, 209, 211, 214,

215, 218, 219

$$\Rightarrow \text{Median}_{\text{aging}} = \frac{\left(\frac{n}{2}\right)^{\text{th}} + \left(\frac{n+1}{2}\right)^{\text{th}}}{2}$$

$$= \frac{\left(\frac{10}{2}\right)^{\text{th}} + \left(\frac{10+1}{2}\right)^{\text{th}}}{2}$$

$$= \frac{5^{\text{th}} + 6^{\text{th}}}{2}$$

$$= \frac{209 + 211}{2}$$

$$= 210$$

↳ Sorted data of no-aging:

216, 217, 218, 221, 222, 225, 227

228, 229

$$\text{Median}_{\text{no-aging}} = \frac{\left(\frac{n}{2}\right)^{\text{th}} + \left(\frac{n+1}{2}\right)^{\text{th}}}{2}$$

$$= \frac{5^{\text{th}} + 6^{\text{th}}}{2}$$

$$= \frac{221 + 222}{2}$$

$$= 221.56$$

Thus, mean and median

for each group are similar.

Q₈

1.4

(a)

$$\begin{aligned} \text{1. Mean}_A &= 9.3 + 8.8 + 6.8 + 8.7 + 8.5 + 6.7 \\ &\quad + 8 + 6.5 + 9.2 + 7 \\ &= \frac{1}{10} \\ &= 7.95 \end{aligned}$$

Sorted data for

$$\begin{aligned} \text{Median}_A &= 6.5, 6.7, 6.8, 7.0, 8.0, \\ &\quad 8.5, 8.7, 8.8, 9.2, 9.3 \end{aligned}$$

$$\begin{aligned} &= \frac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n+1}{2}\right)^{th}}{2} \\ &= \frac{8 + 8.5}{2} \end{aligned}$$

$$\text{Median}_A = 8.250$$

$$\begin{aligned} \text{2. Mean}_B &= 11 + 9.8 + 9.9 + 10.2 + 10.1 \\ &\quad + 9.7 + 11 + 11.1 + 10.2 + 9.6 \\ &= \frac{1}{10} \\ &= 10.260 \end{aligned}$$

Date: _____

Day: _____

Sorted data

for Median_B =

9.6, 9.7, 9.8, 9.9, 10.1, 10.2,
10.2, 11, 11, 11.1

$$= \frac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n+1}{2}\right)^{th}}{2}$$

$$= \frac{5^{th} + 6^{th}}{2}$$

$$= \frac{10.1 + 10.2}{2}$$

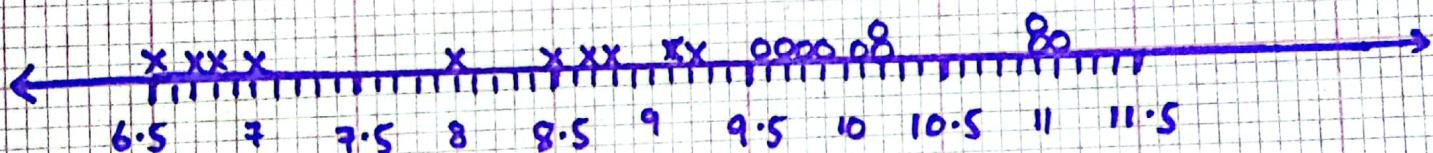
$$\text{Median}_B = 10.150$$

Q

1.4

(b)

Dot plot of data



"x" represents company A

"o" represents company B

Q_{21:}

(a) Mean = $\frac{22 + 18 + 135 + 15 + 90 + 78 + 69 + 98 + 102 + 83 + 55 + 28 + 121 + 120 + 13 + 22 + 124 + 112 + 70 + 66 + 74 + 89 + 103 + 24 + 21 + 112 + 21 + 40 + 98 + 87 + 132 + 115 + 21 + 28 + 43 + 37 + 50 + 96 + 118 + 158 + 74 + 78 + 83 + 93 + 95}{45}$

Mean = 74.02

Median = $\left(\frac{n+1}{2}\right)^{\text{th}} \text{ term}$
= $\left(\frac{45+1}{2}\right)^{\text{th}} \Rightarrow \frac{46}{2}$
= 23rd

Median = 78

(b) Standard deviation = ?

$$S = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$\bar{x} = \frac{\text{sum}}{n}$$

$$= 74.02 \quad (\text{from part (a)})$$

$$s^2 = \frac{(22 - 74.02)^2 + (18 - 74.02)^2 + \dots + (45 - 74.02)^2}{45 - 1}$$

$$= \frac{67810.98}{44}$$

$$= 1541.16$$

$$s^2 = 1541.16$$

$$s = \sqrt{1541.16}$$

$$s = 39.2 \text{ minutes}$$

Q:

1.3D

AWAR NOTES

1500

1400

1300

1200

1100

1000

900

800

700

600

$$Q_3 = 1156$$

$$Q_2 = 1009$$

$$Q_1 = 923$$

max
1505.5

min
573.5

Data is in arranged form below:

702, 765, 783, 811, 832, 855, 896, 902, 905, 918, 919,
920, 923, 929, 936, 938, 948, 950, 956, 958, 970, 972, 978, 1009,
1022, 1035, 1037, 1045, 1067, 1085, 1092, 1102, 1122, 1126,
1151, 1156, 1157, 1157, 1162, 1170, 1195, 1195, 1196, 1217,
1237, 1311, 1333, 1340

$$\text{min} = Q_1 - 1.5(1QR), \text{max} = Q_3 + 1.5(1QR)$$

$$Q_1 = \left(\frac{n+1}{4}\right)^{th} \Rightarrow \left(\frac{50+1}{4}\right) = 13^{th} \Rightarrow 923.$$

$$Q_2 = \left(\frac{n+1}{2}\right)^{th} \Rightarrow \left(\frac{50+1}{2}\right)^{th} \Rightarrow 1009$$

$$Q_3 = 3\left(\frac{n+1}{4}\right)^{th} = 38^{th} \Rightarrow 1156$$

$$1QR = Q_3 - Q_1 \\ = 1156 - 1009 \\ = 233$$

$$\text{min} = 923 - 1.5(233)$$

$$= 573.5$$

$$\text{max} = 1156 + 1.5(233)$$

$$= 1505.5$$

Histogram :



Q:

5 Construct a relative frequency histogram for distribution of 200 workers in a manufacturing company.

Earnings	no of workers	Relative f	class B
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180 - 184	10	$10/200 = 0.050$	179.5 - 184.5
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185 - 189	24	$24/200 = 0.120$	184.5 - 189.5
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190 - 194	30	$30/200 = 0.150$	189.5 - 194.5
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195 - 199	36	$36/200 = 0.180$	194.5 - 199.5
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200 - 204	40	$40/200 = 0.200$	199.5 - 204.5
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205 - 209	29	$29/200 = 0.145$	204.5 - 209.5
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210 - 214	23	$23/200 = 0.115$	209.5 - 214.5
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215 - 219	8	$8/200 = 0.040$	214.5 - 219.5
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200	$\sum = 1$
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