BRAC UNIVERSITY

STA201

Elements of Statistics and Probability

# Assignment 2

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Section: 01


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# Assignment 2

## Answer to the question no 1

| Wage Bracket | Workshops $f_i$ | Workers $g_i$ | Mid wage $x_i$ | $f_i g_i$ | $f_i g_i x_i$ |
|---|---|---|---|---|---|
| 500-600 | 17 | 15 | 550 | 255 | 140250 |
| 600-700 | 28 | 11 | 650 | 308 | 200200 |
| 700-800 | 22 | 9 | 750 | 648 | 486000 |
| 800-900 | 21 | 6 | 850 | 126 | 107100 |
| 900-1000 | 12 | 5 | 950 | 60 | 57000 |
| Total | 150 | 46 | 3750 | 1397 | 990550 |

$$AM = \bar{x} = \frac{\Sigma f_i g_i x_i}{\Sigma f_i g_i} = \frac{990550}{1397} = 709.0551$$

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## Answer to the question no 2

given that,

$\Sigma f_i = 120$

and incorrect mean $= 76$

So, incorrect $\Sigma f_i x_i = 120 \times 76$

$= 9120$

Correct $\Sigma f_i x_i = 9120 - (85 + 43) + (185 + 98)$

$= 9275$

Correct $\bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i} = \frac{9275}{120}$

$= 77.2917$

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## Answer to the question no 3

Let, Male employee number = M

Female employee number = F = (100 − M)

so, total salaries paid to Male employee

$$T_M = 5200\,M$$

and total salaries paid to Female employee

$$T_F = 4200\,F = 4200(100 - M)$$

total ~~salt~~ salaries paid to all employee

$$T = 5000 \times 100$$

$$= 500000$$

So,

$$5200\,M + 4200(100 - M) = 500000$$

$$\therefore M = \frac{80000}{1000} = 80$$

$$\therefore F = (100 - 80) = 20$$

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$\therefore$ Male $= \frac{80}{100} \times 100\%$

$= 80\%$

(b) Female $= \frac{20}{100} \times 100\%$

$= 20\%$

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## Answer to the question no 4

Their average will be calculated with harmonic Mean.

let, third part speed $= x$

So,

$$\frac{3}{\frac{1}{72} + \frac{1}{88} + \frac{1}{x}} = 68$$

$$\Rightarrow \frac{1}{\frac{88x + 72x + 72 \times 88}{72 \times 88 \times x}} = \frac{68}{x}$$

$$\Rightarrow \frac{72 \times 88 \times x}{88x + 72x + 6776} = \frac{68}{3}$$

$$\Rightarrow \frac{6776x}{165x + 6776} = \frac{68}{3}$$

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$$\frac{n}{\frac{1}{72}+\frac{1}{88}+\frac{1}{x}} = 68$$

$$\Rightarrow \frac{1}{72}+\frac{1}{88}+\frac{1}{x} = \frac{n}{68}$$

$$\Rightarrow \frac{1}{x} = \frac{3}{68} - \left(\frac{1}{72}-\frac{1}{88}\right)$$

$$\Rightarrow \frac{1}{x} = \frac{127}{6732}$$

$$\therefore x = 53.01 \text{ (Ans)}$$

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## Answer to the question no 5

Price of the car 3500000 TK.

after 1st year $Y_1 = n\left(1-\frac{40}{100}\right)$

$= .6n$

after 2nd year of use $Y_2 = 0.6n\left(1-\frac{20}{100}\right)$

$= 0.6n \times 0.8$

$= 0.48n$

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after 3rd year of use $Y_3 = 0.48n\left(1-\frac{10}{100}\right)$

$= 0.48n \times 0.90$

$= 0.432n$

average rate of depreciation after 3 year

$\sqrt[3]{0.432}$ $\sqrt[3]{0.6 \times 0.8 \times 0.9}$

$\Rightarrow 0.75595$

after 3rd year price is

$3500000 \times (0.75595)^3$

$\Rightarrow 1511984.219$ TK.

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# Answer to the question no 6

(a)

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

$$= \frac{82+103+130+160+180+195+132+145+211+105+145+153+152+138+87+99+93+119+129}{19}$$

$$= \frac{2563}{19} = 134.895$$

$$\text{Sample variance} = \frac{1}{n-1}\left(\sum (x_i - \bar{x})^2\right)$$

$$= \frac{22765.7895}{19-1}$$

$$s^2 = 1264.77$$

Sample standard deviation

$$s = \sqrt{s^2} = \sqrt{1264.77}$$

$$= 35.564$$

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(b) in hours,

$$s^2 = \frac{1264.27}{3600} = 0.351$$

$$s = \sqrt{0.351} = .593 \text{ (Ans)}$$

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Answer to the question no 7

for ED:

$\frac{1*27}{4} = 7$ is a integer

so, $Q_1 = \frac{1}{2}[1x$

an, $\frac{1 \times 27}{4} = 6.75$ so,

$Q_1 = 7^{th}$ value $= 0.1$

again, $\frac{2 \times 27}{4} = 13.5$ so,

$Q_2 = 14^{th}$ value $= 0.4$

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and,

$$\frac{3 \times 27}{4} = 20.25 \text{ so,}$$

$Q_3$ = 21th value = 2.8

So, for ED.

$Q_1 = 0.1$

$Q_2 = 0.4$

$Q_3 = 2.8$

For, non ED,

$$\frac{1 \times 50}{4} = 12.5 \text{ so,}$$

$Q_1$ = 13th value = 0.3

again,

$$\frac{2 \times 50}{4} = 25 \text{ so,}$$

$$Q_2 = \frac{1}{2}\left[\left(\frac{2 \times 50}{4}\right)\text{th value} + \left(\frac{2 \times 50}{4} + 1\right)\text{th value}\right]$$

$$= \frac{1}{2}[25\text{th value} + 26\text{th value}]$$

$$= \frac{1}{2}[1.5 + 1.7] = 1.6$$

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and,

$\frac{3 \times 50}{4} = 37.5$ so,

$Q_3 = 38$ th value $= 7.9$

∴ for Non ED:

$Q_1 = 0.3$

$Q_2 = 1.6$

$Q_3 = 7.9$

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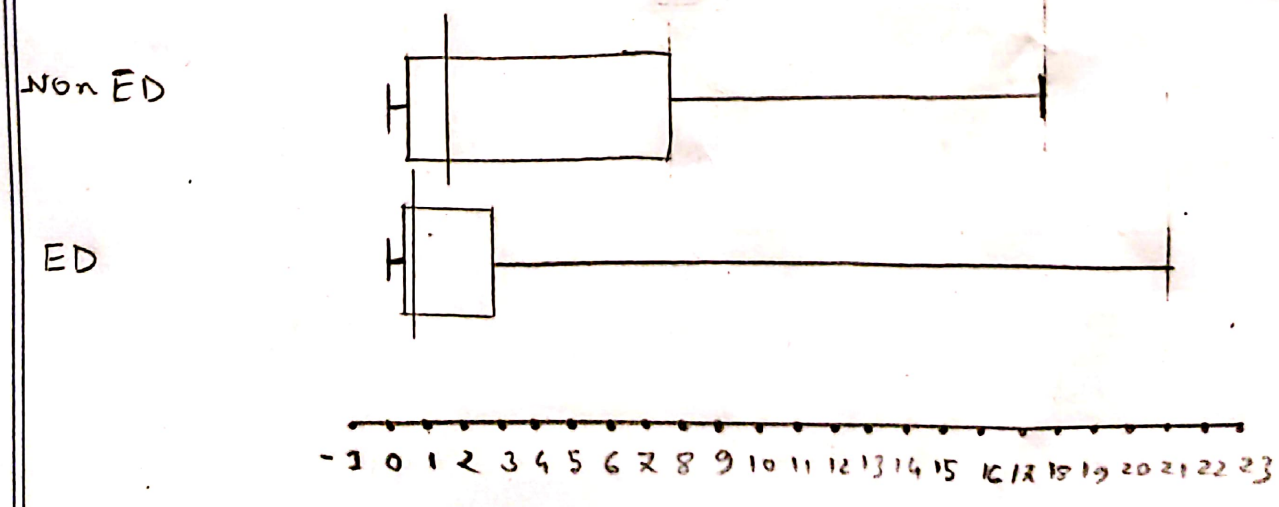
b)



From the box plot we can easily say that for E.D sample 50% of the concentration is between 0.1 mg/L and to 2.8 mg/L. and for Non ED sample it is 0.3 mg/L to 7.9 mg/L. the box plot also shows that both ED and Non ED are positively skewed.