ASSIGNMENT on STA102

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Section: 04

STA102
Statistics and Probability
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JIM

Assignment - 3

Answer to the question no 1

The data in ascending order.

28, 42, 45, 48, 49, 50, 55, 58, 60

(i)

Range = Large value − ~~sam~~ small value

= 60 − 28

= 32

Here,
Large value = 60
Smaller value = 28

Comment: The difference between the most~~v~~ value and the most largest smallest value is 32.

$Q_1 = \left(\dfrac{n+1}{100} \times 25\right)^{th}$ value

$= \left(\dfrac{10 \times 25}{100}\right)^{th}$ value

$= 2.5^{th}$ value

Here,

$n = 9$

So, 2.5^{th} value $= 42 + (45-42) \times 0.5 = 43.5$

$Q_3 = \left(\dfrac{10 \times 75}{100}\right)^{th}$ value $= 7.5^{th}$ value.

So, 7.5^{th} value $= 55 + (58-55) \times 0.5 = 56.5$

So, The $IQR = Q_3 - Q_1 = 56.5 - 43.5 = 13$

Comment: The difference between the largest and smallest 25% is 13.

$$(ii)$$

We know,

Sample variance, $s^2 = \dfrac{\Sigma (x - \bar{x})^2}{n-1}$

$\bullet\ \bar{x} = \dfrac{28 + 42 + 45 + 48 + 49 + 50 + 55 + 58 + 60}{9}$

$= 48.33$

$s^2 = \dfrac{(28-48.33)^2 + (42-48.33)^2 + (45-48.33)^2 + (48-48.33)^2 + (49-48.33)^2 + (50-48.33)^2 + (55+48.33)^2 + (58-48.3}{9-1}$

$+ (60-48.33)^2$

$= 92.75$

Comment: On an average, the squared distance from the mean is 92.75.

$s = \sqrt{\dfrac{\Sigma(x-\bar{x})^2}{n-1}} \qquad = \sqrt{s^2}$

$= \sqrt{\dfrac{742}{8}} \qquad = \sqrt{92.75}$

$= 9.63$

Comment: On an average, the squared distance from the mean is 9.63.

from ii we get the
Standard deviation
variance of Pomo Air Quality index value for

Pomona p.i.s,

$$S_p = 9.63$$

and $\bar{x}_p = 48.33$

So,

$$CV_p = \frac{9.63}{48.33} \times 100 = 19.93\%$$

According to the question

$$S_A = 11.66$$

$$\bar{x}_A = 48.5$$

So, $CV_A = \frac{11.66}{48.5} \times 100 = 29.04\%$

<u>Comment:</u> On an average, Anaheim's air quality is
more scattered the air quality of Pomona.

Answer to the question no 2

Data in ascending order:

| 32 | 32 | 32 | 37 | 37 | 40 | 40 | 40 | 40 | 40 |

| 42 | 46 | 46 | 46 | 46 | 46 | 46 | 52 | 52 | 52 |

| 52 | 52 | 52 |

a

$$\text{Mean} = \frac{\Sigma x}{n}$$

$$= \frac{1000}{23}$$

$$= 43.48$$

here,

$\Sigma x = 1000$

$n = 23$

$$\text{Median} = \left(\frac{N+1}{2}\right)^{th} \text{value} = 12^{th} \text{value} = 46$$

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

$$= \sqrt{\frac{1015.74}{23-1}}$$

$$= 6.795$$

here

$\Sigma(x-\bar{x})^2 = 1015.74$

So,

$$\text{Coefficient of skewed} = \frac{3(43.48 - 46)}{6.795}$$

$$= -1.11$$

Comment:

The shape of the data is left skewed.

Here,

Min = 32.

$$Q_1 = \left(\frac{24 \times 25}{100}\right) = 6^{th} \text{ value} = 40$$

$$Q_2 = \left(\frac{24 \times 50}{100}\right) = 12^{th} \text{ value} = 46$$

$$Q_3 = \left(\frac{24 \times 75}{100}\right) = 18^{th} \text{ value} = 52$$

Max = 52

$$IQR = Q_3 - Q_1 = 12$$

Upper Limit $= Q_3 + (1.5 \times IQR) = 70$
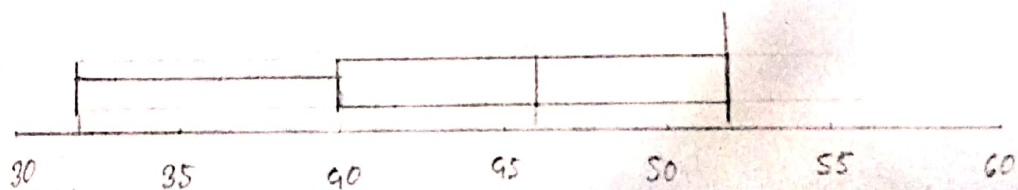
Lower Limit $= Q_1 - (1.5 \times IQR) = 22$

Figure : Box plot of customer visited on Smith's True value store in Bellville, Ohio, over last 23 days.

There is no outlier.

Answer to the question no 3

a

The median is 950.

b

The first quantile is 300.

The third quantile is 750.

c

The $IQR = Q_3 - Q_1 = 750 - 300 = 450$.

d

~~Beyond 0-1350 poin, a value is considered a outlier.~~

Upper Limit $= 750 + (1.5 \times 450) = 1425$

Lower Limit $= 300 - (1.5 \times 450) = -375$

Beyond -375 to 1425 points, a value is considered as outlier.

e

The outlier in the figure is on the 1500 poin.

f

The distribution is positively skewed.