Activity-5

Calculate mean, median, mode, variance, Standard deviation, skewness, kurtosis on data

Set 3, 7, 7, 19, 24, 24, 24, 25, 28, 30.

Mean for data:

$$\frac{3+7+7+19+24+24+24+25+28+30}{10}$$

$$= \frac{191}{10} = 19.1$$

Median for data:

$$\text{Median} = \frac{24+24}{2} = \frac{48}{2} = 24$$

Mode for data:

Mode for data is 24

Variance for data :

$$\frac{1}{10}\Big[(3-19.1)^2+(7-19.1)^2+(7-19.1)^2+(19-19.1)^2+ (24-19.1)^2+(24-19.1)^2+(24-19.1)^2+(25-19.1)^2+ (28-19.1)^2+(30-19.1)^2\Big]$$

$$=\frac{1}{10}\Big[259.21+146.41+146.41+0.01+24.01+ 24.01+24.01+34.81+79.21+118.81\Big]$$

$$=\frac{1}{10}\left[\frac{8569}{10}\right]=\frac{8569}{100}=85.69$$

Standard deviation for data :

$$=\sqrt{85.689}$$

$$=9.256.$$

Range for data :

Range = max(xi) - min(xi)

IQR = $Q_3 - Q_1$

maximum = 30

minimum = 3

Range = 30 - 3 = 27

IQR for data :

IQR = $Q_3 - Q_1$

$Q_1 = [3, 7, 7, 19, 24]$, $Q_3 = [24, 24, 25, 28, 30]$

$Q_3 = \frac{25+28}{2} = 26.5$

$Q_1 = \frac{7+7}{2} = \frac{14}{2} = 7$

$IQR = Q_3 - Q_1 = 26.5 - 7$

$= 19.5$

Skewness for data:

$$\frac{n}{(n-1)(n-2)} \sum_{i=1}^{n} \left(\frac{x_i - \bar{x}}{s}\right)^3$$

$n = 10$

x_i = value in a data set

$\bar{x}$ = Mean value $= 19.1$

s = Standard deviation $= 9.256$

$$\frac{10}{(10-1)(10-2)} \sum_{i=1}^{n} \left(\left(\frac{3-19.1}{9.256}\right)^3 + \left(\frac{7-19.1}{9.256}\right)^3 + \left(\frac{7-19.1}{9.256}\right)^3 + \left(\frac{19-19.1}{9.256}\right)^3 + \left(\frac{24-19.1}{9.256}\right)^3 + \left(\frac{24-19.1}{9.256}\right)^3 + \left(\frac{24-19.1}{9.256}\right)^3 + \left(\frac{25-19.1}{9.256}\right)^3 + \left(\frac{28-19.1}{9.256}\right)^3 + \left(\frac{30-19.1}{9.256}\right)^3 \right)$$

$$= \frac{10}{(10-1)(10-2)} \sum_{i=1}^{n} \left((-5.26) + (-2.23) + (-2.23) + (-1.26 \times 10^{-6}) + (0.148) + (0.148) + (0.148) + (0.258) + (0.888) + (1.633) \right)$$

$$= \frac{10}{(10-1)(10-2)} \sum_{i=1}^{n} -6.497$$

$$= 0.1388 \sum_{i=1}^{n} -6.497$$

$$= 0.1388 \times -6.497$$

$$= -0.902$$

Kurtosis for data:

$$\sum_{i=1}^{n} \left(\frac{x_i - \bar{x}}{s} \right)^4 \frac{n-1}{(n-2)(n-3)}$$

$n = 10$

x_i = value in data

$\bar{x} = 19.1$

$s = 9.256$

$$\sum_{i=1}^{10} \left(\left(\frac{3-19.1}{9.256} \right)^4 + \left(\frac{7-19.1}{9.256} \right)^4 + \left(\frac{7-19.1}{9.256} \right)^4 + \left(\frac{19-19.1}{9.256} \right)^4 + \left(\frac{24-19.1}{9.256} \right)^4 + \left(\frac{24-19.1}{9.256} \right)^4 + \left(\frac{24-19.1}{9.256} \right)^4 + \left(\frac{25-19.1}{9.256} \right)^4 + \left(\frac{28-19.1}{9.256} \right)^4 + \left(\frac{30-19.1}{9.256} \right)^4 \right) \times \frac{10-1}{(10-2)(10-3)}$$

$$\sum_{i=1}^{10} \Big((9.153) + (2.920) + (2.920) + (1.362 \times 10^{-8}) + (0.078) + (0.078) + (0.078) + (0.165) + (0.854) + (1.923) \Big) \times 0.1587$$

$$\sum_{i=1}^{10} (18.169) \times 0.1587$$

$$= 2.883$$