Activity-5

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Batch-32

Calculate the mean, median, variance, mode, standard deviation, skewness, kurtosis on data

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

→ Mode = 24

→ Mean ⇒ $\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$

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

$$\bar{x} = \frac{191}{10} \Rightarrow \boxed{\bar{x} = 19.1}$$

→ Median ⇒ n = 10

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

$\frac{10}{2}$ and $\left(\frac{10}{2}+1\right)$

5^{th} and 6^{th} term

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

→ Variance

$$s^2 = \Sigma\left(\frac{x-\bar{x}}{n-1}\right)^2$$

$x_1 - \bar{x} = 3 - 19.1 = -16.1$ | $x_3 - \bar{x} = 7 - 19.1 = -12.1$

$x_2 - \bar{x} = 7 - 19.1 = -12.1$ | $x_4 - \bar{x} = 19 - 19.1 = -0.1$

$x_6 - \bar{x} = 24 - 19.1 = 4.9$

$x_6 - \bar{x} = 24 - 19.1 = 4.9$

$x_4 - \bar{x} = 24 - 19.1 = 4.9$

$x_8 - \bar{x} = 25 - 19.1 = 5.9$

$x_9 - \bar{x} = 28 - 19.1 = 8.9$

$x_{10} - \bar{x} = 30 - 19.1 = 10.9$

x	$(x - \bar{x})^2$
3	259.2
7	146.4
7	146.4
19	0.01
24	24.01
24	24.01
25	34.81
28	79.21
30	118.81
	856.87

$$S^2 = \frac{856.87}{10-1}$$

$$S^2 = 85.68$$

Standard deviation $= \sqrt{\frac{\Sigma(x+x_i)^2}{n}} = \sqrt{85.68} = 9.262$

Skewness $= \frac{1}{(n-1)(n-2)} \sum \left(\frac{x_i - \bar{x}}{S}\right)^3$

$= \frac{1}{(9)(8)} \left(\frac{19.1}{9.26}\right)^3 = 1.E+0.0$

Kurtosis $= \frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum \left(\frac{x_i - \bar{x}}{S}\right)^4 - \frac{3(n-1)^2}{(n-2)(n-3)}$

$= \frac{10(10+1)}{(10-1)(10-2)(10-3)} \left(\frac{19.1}{9.26}\right)^4 - \frac{3(10-1)^2}{(10-2)(10-3)}$

$$\frac{10(11)}{(9)(8)(7)}\left(\frac{14.1}{9.26}\right)^4 - \frac{3(9)^2}{(8)(7)}$$

kurtosis = -1.128

platykurtic (kurtosis < 0)