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ISE 1 - Component 2 : Tutorial

Q.1] A group of students took a math ~~set~~ s test, and the scores are as follows:
85, 90, 88, 92, 78, 95, 90. Calculate the mean, median and mode of the scores.

→ test scores :- 85 90 88 92 78 95 90.

1) mean = $\frac{85+90+88+92+78+95+90}{7}$

= 618/7 = 88.28

2) median = middle number when you place the numbers in ascending order

78, 85, 88, 90, 90, 92, 95

median = 90

3) mode = number with the highest frequency.

= 90.

Q.2] The monthly incomes (in dollars) of a sample of 8 employees in a company are : $4000, $4,500, $3,800, $4,200, $4800, $4000, $3600, $4500. Calculate the mean, median & mode.

→ 1)

mean = $\frac{4000+4500+3800+4200+4800+4000+3600+4500}{8}$

$= \frac{33400}{8} = 4175$

mode = ₹ 4000, 4500. ∴ mode is 4000 & 4500.

median ₹ 3600, 3800, 4000, 4000, 4200, 4500, 4500, 4800) $= \frac{4000+4200}{2} = 4100$.

∴ median is 4100

Q.3] The weights (in kg) of a sample of 10 apples are 150, 140, 155, 160, 145, 150, 152, 148, 155, 158. Calculate the mean, median and mode.

→

i) mean $= \frac{150+140+155+160+145+150+152+148+155+158}{10}$

$= \frac{1513}{10} = 151.3$

2) median (140, 145, 148, 150, 150, 152, 155, 155, 158, 160).

$= \frac{150+152}{2} = 151$

3) mode = 150, 155.

Q.4] For a set of exam scores, the mean is 75 & the median is 80. What does this suggest about the distribution of scores?

→

The mean of the set of exam scores is 75.

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The median of the set of exam scores is 80. Since, the median is greater than the mean, the distribution of scores must be skewed to the left.

Q.5] Calculate the range of the following dataset : 15, 22, 18, 25, 30, 12, 28.

→ 1) ascending order of data -

12, 15, 18, 22, 25, 28, 30

Lowest value = 12.

Highest value = 30.

∴ Range = Highest value - Lowest value

= 30 - 12 = 18.

Q.6] The monthly rents (in dollars) for a sample of apartments are : $1,200, $1400, $1250, $1300, $1500. Calculate the variance and standard deviation of the rents.

→ rents ⇒ 1200, 1400, 1250, 1300, 1500

Variance :-

1) The first step is to calculate mean.

$$\therefore \text{mean} = \frac{\text{sum}}{\text{no. of data points}} = \frac{1200+1400+1250+1300+1500}{5}$$

$$= \frac{6650}{5} = 1330$$

Now, take each value in dataset, substract the mean and square the difference.

$\therefore (1200-1330)^2 + (1400-1330)^2 + (1250-1330)^2 + (1300-1330)^2 + (1500-1330)^2 = 16900 + 4900 + 6400 + 900 + 28900$

$= 58000$

- The sum is then divided by number of data points.
  58000 / 5 = 11600.

∴ The variance is 11600.

2) Standard deviation :-

Standard deviation = $\sqrt{\text{variance}}$ = $\sqrt{11600}$ = 107.70.

∴ Variance of the rents is $11600 and
Standard deviation is $107.70.

Q.7] The heights (in cm) of a sample of 12 students are: 160, 165, 158, 170, 155, 162, 168, 175, 160, 172, 165, 180, Calculate the variance and standard deviation.

→

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
160	-5.83	33.9889
165	-0.83	0.6889
158	-7.83	61.3089
170	4.17	17.3889
155	-10.83	117.2889
162	-3.83	14.6689
168	2.17	4.7089
175	9.17	84.0889
160	-5.83	33.9889
172	6.17	38.0689
165	-0.83	0.6889
180	14.17	200.7889
$\Sigma x_i = 1990$		$\Sigma (x_i - \bar{x})^2 = 607.6668$

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$$\text{mean} = \bar{x} = \frac{\Sigma x_i}{n} = \frac{1990}{12} = 165.83.$$

$$\text{variance} = \frac{\Sigma (x_i - \bar{x})^2}{n} = \frac{607.66}{12}$$

$$= 50.63$$

$$\text{Standard deviation} = \sqrt{\text{variance}}$$

$$= \sqrt{50.63} = 7.11$$

∴ Variance is 50.63 cm² and
Standard deviation is 7.11 cm.

Q.8] For a set of data the interquartile range (IQR) is 12. If the lower quartile is 20, what is the upper quartile ?

→ interquartile range (IQR) = 12
lower quartile = 20.

interquartile range = upper quartile − lower quartile

12 = upper quartile − 20

∴ upper quartile = 20 + 12 = 32.

∴ upper quartile is 32.