# DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

**Solutions**

Subject : MATHS
DPP No. :7

# Topic :-STATISTICS

122 **(c)**

$r_{xy}=\frac{\text{cov(x,y)}}{\sqrt{\text{var(x)var(y)}}}$

$=\frac{10.2}{\sqrt{(8.25)(33.96)}}=0.61$

124 **(b)**

Let us assume that line of regression y on x is $3x+12y=19$ $and\ x\ on\ y\ is$ $3y+9x=46$.

$\therefore b_{yx}=-\frac{3}{12}\ and\ b_{xy}=-\frac{3}{9}=-\frac{1}{3}$

$\therefore r_{xy}=-\sqrt{b_{yx}\times b_{xy}}=-\sqrt{\left(\frac{3}{12}\right)\times\left(\frac{1}{3}\right)}$

$=-\sqrt{\frac{1}{12}}=-\sqrt{0.083}$

$=-0.289$

125 **(c)**

$\text{Cov}(x,y)=\frac{1}{n}\Sigma xy-\bar{x}\bar{y}$

$=\frac{1}{2}(110)-\left(\frac{15}{5}\right)\left(\frac{36}{5}\right)=\frac{2}{5}$

127 **(d)**

Let $x_1, x_2, x_3,...,x_n$ be $n$ observation

$\therefore\quad \bar{x}=\frac{\sum x_i}{n}\quad$ ...(i)

New mean $=\frac{\sum x_i+x_{n+1}}{n+1}$

According to the question $\bar{x}=\frac{\sum x_i+x_{n+1}}{n+1}$

$\Rightarrow\ (n+1)\bar{x}=n\bar{x}+x_{n+1}$

$\Rightarrow\ x_{n+1}=\bar{x}$

130 **(c)**

Let $x_1,x_2,x_3,...,x_n$ be $n$ observations. Then,

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

$\therefore$ New mean, $\bar{X} = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i}{\alpha} + 10\right)$

$= \frac{1}{\alpha}\left(\frac{1}{n}\sum_{i=1}^{n} x_i\right) + \frac{1}{n}.(10n)$

$= \frac{1}{\alpha}\bar{x} + 10 = \frac{\bar{x} + 10\alpha}{\alpha}$

131 **(b)**

Since, there are 19 observations. So, the middle term is 10th

After including 8 and 32, *ie*, 8 will come before 30 and 32 will come after 30

Here, new median will remain 30

132 **(b)**

We have,

$\sigma^2 = \frac{1}{n}\sum_{i=1}^{n} x_i^2 - \left(\frac{1}{n}\sum_{i=1}^{n} x_i\right)^2$

$\Rightarrow \sigma^2 = \frac{1}{n}(1^2 + 2^2 + \dots + n^2) - \left(\frac{1}{n}(1 + 2 + \dots + n)\right)^2$

$\Rightarrow \sigma^2 = \frac{1}{n} \times \frac{n(n+1)(2n+1)}{6} - \left(\frac{n+1}{2}\right)^2 = \frac{n^2 - 1}{12}$

133 **(c)**

| Class | $f_i$ | $y_i$ | $D_i = y_i - A$ $A = 25$ | $f_i d_i$ | $f_i d_i^2$ |
|---|---|---|---|---|---|
| 0-10 | 1 | 5 | -20 | -20 | 400 |
| 10-20 | 3 | 15 | -10 | -30 | 300 |
| 20-30 | 4 | 25 | 0 | 0 | 0 |
| 30-40 | 2 | 35 | 10 | 20 | 200 |
| **Total** | **10** | | | **-30** | **900** |

$\therefore \quad \sigma^2 = \frac{\Sigma f_i d_i^2}{\Sigma f_i} - \left(\frac{\Sigma f_i d_i}{\Sigma f_i}\right)^2$

$= \frac{900}{10} - \left(\frac{-30}{10}\right)^2 = 90 - 9$

$\Rightarrow \quad \sigma^2 = 81$

$\Rightarrow \sigma = 9$

134 **(a)**

Arranging the given values in ascending order of magnitude

$x - \frac{7}{2}, x - 3, x - \frac{5}{2}, x - 2, x + \frac{1}{2}, x + 4, x + 5$

There are 8 observations in the series, therefore

$$\text{median} = \frac{\text{Value of 4th term} + \text{Value of 5th term}}{2}$$

$$= \frac{x - 2 + x - \frac{1}{2}}{2} = x - \frac{5}{4}$$

136 **(d)**

The required AM is given by

$$\text{AM} = \frac{1}{n}\sum_{i=1}^{n}(i+1)x_i$$

$$\Rightarrow \text{AM} = \frac{1}{n}\sum_{i=1}^{n}(i+1)i$$

$$\Rightarrow \text{AM} = \frac{1}{n}\left\{\sum_{i=1}^{n}(i^2+i)\right\}$$

$$\Rightarrow \text{AM} = \frac{1}{n}\left\{\sum_{i=1}^{n}i^2 + \sum_{i=1}^{n}i\right\}$$

$$\Rightarrow \text{AM} = \frac{1}{n}\left\{\frac{n(n+1)(2n+1)}{6} + \frac{n(n+1)}{2}\right\}$$

$$\Rightarrow \text{AM} = \frac{(n+1)(2n+1)}{6} + \frac{n+1}{2}$$

$$\Rightarrow \text{AM} = \frac{(n+1)(5n+4)}{6}$$

| ANSWER-KEY | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Q. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **A.** | A | C | C | B | C | C | D | C | D | C |
| | | | | | | | | | | |
| Q. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **A.** | B | B | C | A | C | D | A | B | B | C |
| | | | | | | | | | | |