DPP
DAILY PRACTICE PROBLEMS

Class : XIth | **Solutions** | **Subject : MATHS**
Date : | | **DPP No. :10**

Topic :-STATISTICS

181 **(d)**

Given that, $n_1 = 4,\ \bar{x} = 7.5,\ n_1 + n_2 = 10,\ \bar{x} = 6$

$\therefore\ 6 = \dfrac{4 \times 7.5 + 6 \times \bar{x}_2}{10}$

$\Rightarrow\ 60 = 30 + 6\bar{x}_2$

$\Rightarrow \bar{x}_2 = \dfrac{30}{6} = 5$

182 **(c)**

Since, percentage of coefficient of variation

$= \dfrac{\text{Standerd deviation}}{\text{Mean}} \times 100$

$\therefore 45 = \dfrac{\sigma}{12} \times 100$

$\Rightarrow \sigma = \dfrac{45 \times 12}{100} = 5.4$

183 **(c)**

Given that, $x_1 < x_2 < x_3 < \dots < x_{201}$

$\therefore$ Median of the given observation $= \left(\frac{201+1}{2}\right)$th item Now, deviation will be minimum of taken from the median. $\therefore$ Mean deviation will be minimum, if $k = x_{101}$

184 **(a)**

It is true that median and mode can be determined graphically

186 **(b)**

Given that, $\sum_{i=1}^{20} (x_i - 30) = 2$

$\Rightarrow \displaystyle\sum_{i=1}^{20} x_i - \sum_{i=1}^{20} (30) = 2$

$\Rightarrow\ \bar{x} = \dfrac{20.30}{20} + \dfrac{2}{20}$

$= 30 + 0.1 = 30.1$

187 **(c)**

Let the number of boys and girls be x and y

$\therefore\ 52x + 42y = 50(x + y)$

$\Rightarrow 2x = 8y$

$\Rightarrow x = 4y$

$\therefore$ Total number of students in the class

$= x + y = 5y$

$\therefore$ Required percentage of boys

$= \frac{4y}{5y} \times 100\% = 80\%$

188 **(a)**

Since, $\frac{x + (x+2) + (x+4) + (x+6) + (x+8)}{5} = 11$

$\Rightarrow \frac{5x + 20}{5} = 11 \Rightarrow x = 7$

$\therefore$ Mean of the last three values $= \frac{11 + 13 + 15}{3} = 15$

189 **(c)**

Let $a, a, \ldots n$ times and $-a, -a, \ldots, n$ times, ie, mean=0

And SD=$\sqrt{\frac{n(a-0)^2 + n(-a-0)^2}{2n}} = 2 \quad (given)$

$\Rightarrow 4 = \frac{2na^2}{2n}$

$\Rightarrow a^2 = 4$

$\Rightarrow |a| = 2$

190 **(b)**

The required mean is given by

$$\overline{X} = \frac{1 \cdot 1^2 + 2 \cdot 2^2 + 3 \cdot 3^2 + \ldots + n \cdot n^2}{1^2 + 2^2 + \ldots + n^2} = \frac{\sum n^3}{\sum n^2}$$

$$\Rightarrow \overline{X} = \frac{\left\{\frac{n(n+1)^2}{2}\right\}^2}{\frac{n(n+1)(2n+1)}{6}} = \frac{3\,n(n+1)}{2(2\,n+1)}$$

193 **(c)**

Here, $n = 7$, sum=315

$\therefore\ Mean = \frac{315}{7} = 45$

Now, standard deviation

$$= \sqrt{\frac{(12-45)^2 + (23-45)^2 + (34-45)^2 + (45-45)^2 + (56-45)^2 + (67-45)^2 + (78-45)^2}{7}}$$

$$= \sqrt{\frac{2(1089+484+121)}{7}} = \sqrt{\frac{3388}{7}}$$

$\sqrt{484} = 22$

194 **(a)**

We know, $\sigma^2 = \frac{n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)}{n_1 + n_2}$

Where $d_1 = m_1 - a$, $d_2 = m_2 - a$, a being the mean of the whole group

$$\therefore \ 15.6 = \frac{100 \times 15 + 150 \times m_2}{250}$$

$\Rightarrow \ m_2 = 16$

Thus, $13.44 = \frac{[(100 \times 9 + 150 \times \sigma^2) + 100 \times (0.6)^2 + 150 \times (0.4)^2]}{250}$

$\Rightarrow \ \sigma = 4$

195 **(a)**

We have,

$\text{GM} = (1 \times 2 \times 4 \times 8 \times \ldots \times 2^n)^{1/n} = (1 \times 2^1 \times 2^2 \times 2^3 \times \ldots \times 2^n)^{1/n}$

$\Rightarrow \text{GM} = \left\{2^{\frac{n(n+1)}{2}}\right\}^{1/n} = 2^{\frac{n+1}{2}}$

196 **(a)**

Given the standard deviation (SD) of the variable x is 10.

$\therefore$ Standard deviation of $50+5x = 5x = 50 \ \ [\because x = 10]$

197 **(c)**

Given, $3x + 2y = 26$

$$\Rightarrow y = -\frac{3}{2}x + 13$$

And $6x + y = 31$

$$\Rightarrow \ x = -\frac{1}{6}y + \frac{31}{6}$$

$$\therefore \ r = -\sqrt{\left(\frac{-3}{2}\right)\left(\frac{-1}{6}\right)}$$

$$\Rightarrow r = -\frac{1}{2}$$

198 **(b)**

We Know, $(\sigma_x - \sigma_y)^2 \geq 0$

$\Rightarrow \sigma_x^2 + \sigma_x^2 \geq 2\sigma_x\sigma_y$

$$\Rightarrow \frac{\sigma_x\sigma_y}{\sigma_x^2 + \sigma_y^2} \leq \frac{1}{2}$$

If θ *is* angle between two regression lines with correlation coefficient y, *then* $\tan\theta = \left(\frac{1-y^2}{y}\right)\left(\frac{\sigma_x\sigma_y}{\sigma_x^2+\sigma_y^2}\right)$

$\Rightarrow tan\theta \leq \frac{1-y^2}{2y}$

$\Rightarrow \tan^2\theta \leq \left(\frac{1-y^2}{2y}\right)^2$

Since, $\sin^2\theta \leq 1$ $and 1-y^2 < 1+y^2$

$\therefore sin\theta \leq 1-y^2$

199 **(c)**

Given, SD $= 2 = \sqrt{\frac{100}{n} - \left(\frac{20}{n}\right)^2}$

$\Rightarrow 4 = \frac{100}{n} - \frac{400}{n^2}$

$\Rightarrow n^2 - 25n + 100 = 0$

$\Rightarrow n = 20,5$

200 **(a)**

${}^{2n}C_0, {}^{2n}C_1, {}^{2n}C_{2,....,} {}^{2n}C_n$ are binomial coefficients which are in odd numbers (because n is even) and middle binomial coefficient is ${}^{2n}C_{n/2}$which is required median.

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