DPP

DAILY PRACTICE PROBLEMS

Class : XIth
Subject : MATHS
Date :
DPP No. :3

Solutions

41 **(d)**

Here, $N=\Sigma f=20$

$Q_1=\frac{N+1}{4}th=\left(\frac{21}{4}\right)th=3rd$ observation

Similarly, $Q_3=3\left(\frac{N+1}{4}\right)th$

$=\left(\frac{63}{4}\right)th=5\ th$ observation

$\therefore$ QD$=\frac{1}{2}(Q_3-Q_1)=\frac{1}{2}(5-3)=1$

Topic :-STATISTICS

44 **(a)**

The required mean X is given by

$$\overline{X}=\frac{0\times {}^nC_0q^np^0+1\times {}^nC_1q^{n-1}p+\cdots+n\times {}^nC_nq^0p^n}{{}^nC_0q^np^0+{}^nC_1q^{n-1}p^1+\cdots+{}^nC_nq^{n-n}p^n}$$

$$\Rightarrow \overline{X}=\frac{\sum_{r=0}^{n}r\times {}^nC_rq^{n-r}p^r}{\sum_{r=0}^{n}{}^nC_rq^{n-r}p^r}$$

$$\Rightarrow \overline{X}=\frac{\sum_{r=1}^{n}r\times\frac{n}{r}\ {}^{n-1}C_{r-1}q^{n-r}\times p\times p^{r-1}}{\sum_{r=0}^{n}{}^nC_rq^{n-r}p^r}$$

$$\Rightarrow \overline{X}=\frac{np\{\sum_{r=1}^{n}{}^{n-1}C_{r-1}p^{r-1}q^{(n-1)-(r-1)}\}}{\sum_{r=0}^{n}{}^nC_rq^{n-r}p^r}$$

$$\Rightarrow \overline{X}=\frac{np(q+p)^{n-1}}{(q+p)^n}$$

$$\Rightarrow \overline{X}=np\qquad[\because q+p=1]$$

46 **(a)**

Let the mean of the remaining 4 observations be $\overline{X}_1$. Then,

$$M=\frac{a+4\overline{X}_1}{(n-4)+4}\Rightarrow \overline{X}_1=\frac{n\,M-a}{4}$$

48 **(b)**

Total number of workers =300

Retrenched =15% of 300=45

These are all from age group $(20-28)$

Prematured retried =20% of 300=60

=18 from age group $52-60$

And 42 from age group $(44-52)$

$\therefore$ Age limit of workers retained is $28-44$

49 **(b)**

Total number of students=100

Average marks of the class=72

Total marks of the class $=72\times100=7200$

And total marks of the boys $=70\times75=5250$

So, total marks of the girls$=7200-5250=1950$

Hence, average of girls $=\frac{1950}{30}=65$

50 **(c)**

Let n be the number of newspapers which are read

Then, $60n=(300)\times5$

$\Rightarrow n=25$

52 **(a)**

Since, MD $=\frac{4}{5}\sigma$, QD $=\frac{2}{3}\sigma$

$\therefore\ \frac{\text{MD}}{\text{QD}}=\frac{6}{5}$

$\Rightarrow$ QD $=\frac{5}{6}$ (MD) $=\frac{5}{6}(15)=12.5$

54 **(c)**

$$\bar{x}=\frac{\text{Sum of quantities}}{n}=\frac{\frac{n}{2}(a+1)}{n}$$

$$=\frac{1}{2}[1+1+100d]=1+50d$$

$$\therefore MD=\frac{1}{n}\Sigma|'x_i-\overline{x}|$$

$$\Rightarrow 255=\frac{1}{101}[50d+49d+\cdots+d+0+d+\cdots+50d]$$

$$=\frac{2d}{101}\left[\frac{50\times51}{2}\right]$$

$$\Rightarrow d=\frac{255\times101}{50\times51}=10.1$$

55 **(d)**

Since, 44 kg is replaced by 46 kg and 27 kg is replaced by 25 kg, then the given series becomes 31, 35, 25, 29, 32, 43, 37, 41, 34, 28, 36, 46, 45, 42, and 30.

On arranging this series in ascending order, we get

25, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 45, 46.

Total numbers of students are 15, therefore middle term is 8^{th} whose corresponding value is 35.

56 **(d)**

CI	x	f	xf
0-10	5	4	20
10-20	15	6	90
20-30	25	10	250
30-40	35	16	560
40-50	45	14	630
		$\sum f = 50$	$\sum fx = 1550$

$\therefore$ Mean $\frac{\sum fx}{\sum f} = \frac{1550}{50} = 31$

57 **(b)**

Given, $\sigma_{10}^2 = \frac{99}{12} = \frac{33}{4}$

$\Rightarrow \sigma_{10} = \frac{\sqrt{33}}{2}$

SD of required series$=3\sigma_{10} = \frac{3\sqrt{33}}{2}$

58 **(b)**

Let $x_1, x_2, \dots, x_n$ be a raw data. Then,

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

If each value is multiplied by h, then the values are $h\,x_1, h\,x_2, \dots, h\,x_n$. The AM of the new values is

$$\frac{h\,x_1 + h\,x_2 + \cdots + h\,x_n}{n} = h\,\overline{X}$$

The variance σ_1^2 of the new set of values is given by

$$\sigma_1^2 = \frac{1}{n}\sum_{i=1}^{n}(h\,x_i - h\,\overline{X})^2 = h^2\left\{\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{X})^2\right\} = h^2\sigma^2$$

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