RD SHARMA
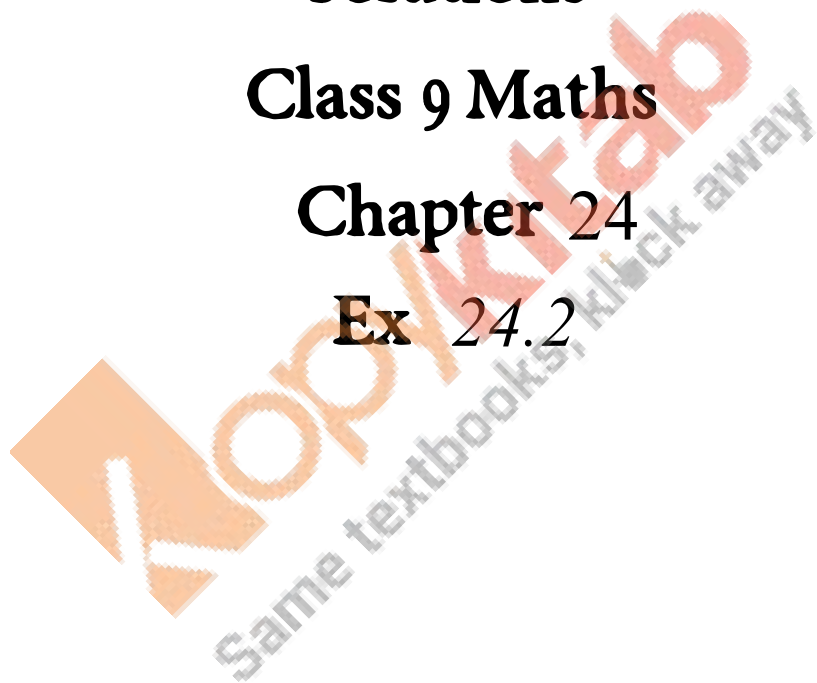
Solutions

Class 9 Maths

Chapter 24

Ex 24.2

Q 1 . Calculate the mean for the following distribution :

x :   5   6   7   8   9

f :   4   8   14   11   3

SOLUTION :

x	f	fx
5	4	20
6	8	48
7	14	98
8	11	88
9	3	27
	N=40	$\sum fx = 281$

$\therefore$ Mean $\overline{x} = \dfrac{\sum fx}{N}$

$= \dfrac{281}{40}$ = 7.025.

Q 2 . Find the mean of the following data :

x :   19   21   23   25   27   29   31

f :   13   15   16   18   16   15   13

SOLUTION :

x	f	fx
19	13	247
21	15	315
23	16	368
25	18	450
27	16	432
29	15	435
31	13	403
	N=106	$\sum fx = 2650$

$\therefore$ Mean $\overline{x} = \dfrac{\sum fx}{N}$

$= \dfrac{2650}{106}$ = 25.

Q 3 . The mean of the following data is 20.6 .Find the value of p.

x :   10   15   p   25   35

f :	3	10	25	7	5

SOLUTION :

x	f	fx
10	3	30
15	10	150
P	25	25p
25	7	175
35	5	175
	N = 50	$\sum fx = 25p + 530$

It is given that ,

Mean = 20.6

$$\Rightarrow \frac{\sum fx}{N} = 20.6$$

$$\Rightarrow \frac{25p+530}{50} = 20.6$$

$$\Rightarrow 25p + 530 = 20.6 \times 50$$

$$\Rightarrow 25p = 1030 - 530$$

$$\Rightarrow 25p = 500$$

$$\Rightarrow p = \frac{500}{25} = 20$$

$$\Rightarrow p = 20$$

$$\therefore p = 20.$$

Q 4 . If the mean of the following data is 15 , find p.

x :	5	10	15	20	25
f :	6	p	6	10	5

SOLUTION :

x	f	fx
5	6	30
10	P	10p
15	6	90
20	10	200
25	5	125
	N=p+27	$\sum fx = 10p + 445$

It is given that ,

Mean = 15

$$\Rightarrow \frac{\sum fx}{N} = 15$$

$$\Rightarrow \frac{10p+445}{p+27} = 15$$

$$\Rightarrow 10p + 445 = 15 \times (p + 27)$$

$$\Rightarrow 10p + 445 = 15p + 405$$

$$\Rightarrow 15p - 10p = 445 - 405$$

$$\Rightarrow 5p = 40$$

$$\Rightarrow p = \frac{40}{5} = 8$$

$$\Rightarrow p = 8$$

$$\therefore p = 8.$$

Q 5 . Find the value of p for the following distribution whose mean is 16.6.

| x : | 8 | 12 | 15 | p | 20 | 25 | 30 |
| f : | 12 | 16 | 20 | 24 | 16 | 8 | 4 |

SOLUTION :

x	f	fx
8	12	96
12	16	192
15	20	300
P	24	24p
20	16	320
25	8	200
30	4	120
	N=100	$\sum fx = 24p + 1228$

It is given that ,

Mean = 16.6

$$\Rightarrow \frac{\sum fx}{N} = 16.6$$

$$\Rightarrow \frac{24p+1228}{100} = 16.6$$

$$\Rightarrow 24p + 1228 = 1660$$

$$\Rightarrow 24p = 1660 - 1228$$

$$\Rightarrow 24p = 432$$

$\Rightarrow$ p = $\frac{432}{24}$ =18

$\Rightarrow$ p = 18

$\therefore$ p = 18.

Q 6 . Find the missing value of p for the following distribution whose mean is 12.58 .

x :	5	8	10	12	p	20	25
f :	2	5	8	22	7	4	2

SOLUTION :

x	f	fx
5	2	10
8	5	40
10	8	80
12	22	264
P	7	7p
20	4	80
25	2	50
	N = 50	$\sum fx = 7p + 524$

It is given that ,

Mean = 12.58

$\Rightarrow \frac{\sum fx}{N} = 12.58$

$\Rightarrow \frac{7p+524}{50} = 12.58$

$\Rightarrow 7p + 524 = 629$

$\Rightarrow 7p = 629 - 524$

$\Rightarrow 7p = 105$

$\Rightarrow$ p = $\frac{105}{7}$ =15

$\Rightarrow$ p = 15

$\therefore$ p = 18.

Q 7 . Find the missing frequency (p) for the following distribution whose mean is 7.68 .

x :	3	5	7	9	11	13
f :	6	8	15	p	8	4

SOLUTION :

x	f	fx

3	6	18
5	8	40
7	15	105
9	P	9p
11	8	88
13	4	52
	N=p+41	$\sum fx = 9p + 303$

It is given that ,

Mean = 7.68

$$\Rightarrow \frac{\sum fx}{N} = 7.68$$

$$\Rightarrow \frac{9p+303}{p+41} = 7.68$$

$$\Rightarrow 9p + 303 = 7.68p + 314.88$$

$$\Rightarrow 9p - 7.68p = 314.88 - 303$$

$$\Rightarrow 1.32p = 11.88$$

$$\Rightarrow p = \frac{11.88}{1.32} = 9$$

$$\Rightarrow p = 9$$

$$\therefore p = 9.$$

Q 8 . Find the value of p , if the mean of the following distribution is 20 .

x :	15	17	19	20+p	23
f :	2	3	4	5p	6

SOLUTION :

x	f	fx
15	2	30
17	3	51
19	4	76
20+p	5p	$100p + 5p^2$
23	6	138
	N=5p+15	$fx = 5p^2 + 100p + 295$

It is given that ,

Mean = 20

$$\Rightarrow \frac{\sum fx}{N} = 20$$

$$\Rightarrow \frac{5p^2+100p+295}{5p+15} = 20$$

$$\Rightarrow 5p^2 + 100p + 295 = 20\,(5p + 15)$$

$$\Rightarrow 5p^2 + 100p + 295 = 100p + 300$$

$$\Rightarrow 5p^2 = 300 - 295$$

$$\Rightarrow 5p^2 = 5$$

$$\Rightarrow p^2 = 1$$

$$\Rightarrow p = \pm 1$$

Frequency can't be negative.

Hence, value of p is 1.

Q 9 . Find the mean of the following distribution :

x :	10	12	20	25	35
f :	3	10	15	7	5

SOLUTION :

x	f	fx
10	3	30
12	10	120
20	15	300
25	7	175
35	5	175
	N=40	$\sum fx = 800$

$$\therefore \text{Mean } \overline{x} = \frac{\sum fx}{N}$$

$$= \frac{800}{40} = 20.$$

Q 10. Candidates of four schools appear in a mathematics test. The data were as follows :

Schools	No. Of Candidates	Average Score
I	60	75
II	48	80
III	Not Available	55
IV	40	50

If the average score of the candidates of all four schools is 66 , Find the number of candidates that appeared from school III .

SOLUTION :

Schools	No. Of Candidates	Average Score
I	60	75
II	48	80
III	x	55
IV	40	50

Given the average score of all schools =66

$$\Rightarrow \frac{N_1\bar{x}_1 + N_2\bar{x}_2 + N_3\bar{x}_3 + N_4\bar{x}_4}{N_1 + N_2 + N_3 + N_4} = 66$$

$$\Rightarrow \frac{60\times75 + 48\times80 + x\times55 + 40\times50}{60 + 48 + x + 40} = 66$$

$$\Rightarrow \frac{4500 + 3840 + 55x + 2000}{148 + x} = 66$$

$$\Rightarrow \frac{10340 + 55x}{148 + x} = 66$$

$$\Rightarrow 10340 + 55x = 66x + 9768$$

$$\Rightarrow 10340 - 9768 = 66x - 55x$$

$$\Rightarrow 11x = 572$$

$$\Rightarrow x = \frac{572}{11} = 52$$

$\therefore$ No. of candidates appeared from school III = 52.

Q 11 . Five coins were simultaneously tossed 1000 times and at each, toss the number of heads was observed. The number of tosses during which 0 , 1 , 2 , 3 , 4 and 5 heads were obtained are shown in the table below. Find the mean number of heads per toss.

No . of heads per toss	No.of tosses
0	38
1	144
2	342
3	287
4	164
5	25
Total	1000

SOLUTION :

No . of heads per toss(x)	No.of tosses(f)	fx

0	38	0
1	144	144
2	342	684
3	287	861
4	164	656
5	25	125
	N=1000	$\sum fx = 2470$

$\therefore$ Mean number of heads per toss = $\dfrac{\sum fx}{N}$

= $\dfrac{2470}{1000}$

= 2.47

Q 12 . Find the missing frequencies in the following frequency distribution if it is known that the mean of the distribution is 50.

x :   10   30   50   70   90

f :   17 f_1 32 f_2 19

Total=120

SOLUTION :

x	f	fx
10	17	170
30	f_1	$30f_1$
50	32	1600
70	f_2	$70f_2$
90	19	1710
	N=120	$\sum fx = 3480 + 30f_1 + 70f_2$

It is given that

Mean = 50

$\Rightarrow \dfrac{\sum fx}{N} = 50$

$\Rightarrow \dfrac{3480+30f_1+70f_2}{N} = 50$

$\Rightarrow 3480 + 30f_1 + 70f_2 = 50 \times 120$

$\Rightarrow 30f_1 + 70f_2 = 6000 - 3480$

$\Rightarrow 10\,(3f_1 + 7f_2) = 10\,(252)$

$\Rightarrow 3f_1 + 7f_2 = 252 \cdots \cdots (1)$ [∵ Divide by 10]

And N = 20

$\Rightarrow 17 + f_1 + 32 + f_2 + 19 = 120$

$\Rightarrow 68 + f_1 + f_2 = 120$

$\Rightarrow f_1 + f_2 = 120 - 68$

$\Rightarrow f_1 + f_2 = 52$

Multiply with 3 on both sides

$\Rightarrow 3f_1 + 3f_2 = 156 \cdots \cdots (2)$

Subtracting equation (2) from equation (1)

$\Rightarrow 3f_1 + 7f_2 - 3f_1 - 3f_2 = 252 - 156$

$\Rightarrow 4f_2 = 96$

$\Rightarrow f_2 = \frac{96}{4} = 24$

Put the value of f_2 in equation (1)

$\Rightarrow 3f_1 + 7 \times 24 = 252$

$\Rightarrow 3f_1 = 252 - 168$

$\Rightarrow f_1 = \frac{84}{3} = 28$

$\Rightarrow f_1 = 28$