Statistics Ex 7.4 Q5

Answer :

First we prepare the following cummulative table to compute the median.

Marks	No. of Students: (f_i)	Cumulative Frequency $(c.f.)$
0-10	15	15
10-20	20	35
20-30	25	60
30-40	24	84
40-50	12	96
50-60	31	127
60-70	71	198
70-80	52	250
	$N=250$	

Here, $N=250$

So, $\frac{N}{2}=125$

Thus, the cumulative frequency just greater than 125 is 127 and the corresponding class is $50-60$.

Therefore, $50-60$ is the median class.

Here, $l=50, f=31, F=96$ and $h=10$

We know that

$$\text{Median}=l+\left\{\frac{\frac{N}{2}-F}{f}\right\}\times h$$

$$=50+\left\{\frac{125-96}{31}\right\}\times 10$$

$$=50+\frac{29\times 10}{31}$$

$$=50+\frac{290}{31}$$

$$=50+9.35$$

$$=59.35$$

Hence, the median is 59.35.

Statistics Ex 7.4 Q6

Answer :

Let the frequency of the class 20–30 be f_1 and that of class 40–50 be f_2. The total frequency is 170.

So,

$10+20+f_1+40+f_2+25+15=170$

So, $f_1+f_2=60$ .....(1)

It is given that median is 35 which lies in the class 30-40. So 30-40 is the median class.

Now, lower limit of median class $(l)=30$

Height of the class $(h)=10$

Frequency of median class $(f)=40$

Cumulative frequency of preceding median class $(F)=10+20+f_1$

Total frequency $(N)=170$

Formula to be used to calculate median,

$$=l+\left(\frac{\frac{N}{2}-F}{f}\right)(h)$$

Where,

l - Lower limit of median class

h - Height of the class

f - Frequency of median class

F - Cumulative frequency of preceding median class

N - Total frequency

Put the values in the above,

$$35 = 30 + \left(\frac{\frac{170}{2} - (30 + f_1)}{40} \right)(10)$$

$$f_1 = -20 + \frac{170}{2} - 30$$

$$= 35$$

Using equation (1), we have

$$f_2 = 25$$

Therefore,

$$\boxed{\begin{aligned} f_1 &= 35 \\ f_2 &= 25 \end{aligned}}$$

********** END **********