



Statistics Ex 7.4 Q9

Answer :

(i) Let the missing frequencies be x and y .

First we prepare the following cumulative table.

Variable:	Frequency: (f_i)	Cumulative frequency ($c.f.$)
10-20	12	12
20-30	30	42
30-40	x	$42 + x$
40-50	65	$107 + x$
50-60	y	$107 + x + y$
60-70	25	$132 + x + y$
70-80	18	$150 + x + y$
	$N = 150 + x + y$	

Here, $N = 230$

So, $\frac{N}{2} = 115$

It is given that the median is 46.

Therefore, 40 – 50 is the median class.

$$l = 40, f = 65, F = 42 + x \text{ and } h = 10$$

We know that

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

$$46 = 40 + \left\{ \frac{115 - (42 + x)}{65} \right\} \times 10$$

$$6 = \frac{(73 - x) \times 10}{65}$$

$$39 = (73 - x)$$

$$x = 73 - 39$$

$$x = 34$$

Also,

$$N = 230$$

$$150 + x + y = 230$$

Putting the value of x, we get

$$150 + 34 + y = 230$$

$$y = 230 - 184$$

$$y = 46$$

Hence, the missing frequencies are 34 and 46.

(ii)

We may prepare the table as shown.

Variable:	Midvalue (x_i):	Frequency: (f_i)	$d_i = x_i - A$ $= x_i - 45$	$u_i = \frac{1}{h}(d_i)$ $= \frac{1}{10}(d_i)$	$f_i u_i$
10 – 20	15	12	–30	–3	–36
20 – 30	25	30	–20	–2	–60
30 – 40	35	34	–10	–1	–34
40 – 50	45	65	0	0	0
50 – 60	55	46	10	1	46
60 – 70	65	25	20	2	50
70 – 80	75	18	30	3	54
		$\sum f_i = 230$			$\sum f_i u_i = 20$

We know that mean, $\bar{X} = A + h \left(\frac{1}{N} \sum f_i u_i \right)$

Now, we have $N = \sum f_i = 230$, $\sum f_i u_i = 20$, $h = 10$ and $A = 45$.

Putting the values in the above formula, we have

$$\begin{aligned}\bar{X} &= A + h \left(\frac{1}{N} \sum f_i u_i \right) \\&= 45 + 10 \left(\frac{1}{230} \times (20) \right) \\&= 45 + \frac{200}{230} \\&= 45 + 0.87 \\&= 45.87\end{aligned}$$

Hence, the mean is 45.87.

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