Statistics Ex 7.4 Q10

Answer :

Here, the frequency table is given in inclusive form. So, we first transform it into exclusive form by subtracting and adding $h/2$ to the lower and upper limits respectively of each class, where h denotes the difference of lower limit of a class and upper limit of the previous class.

Class Intervals	Frequency	Cumulative Frequency
14.5 – 19.5	53	53
19.5 – 24.5	140	193
24.5 – 29.5	98	291
29.5 – 34.5	32	323
34.5 – 39.5	12	335
39.5 – 44.5	9	344
44.5 – 49.5	5	349
49.5 – 54.5	3	352
54.5 – 59.5	3	355
59.5 – 64.5	2	357
	N = 357	

We have, $N = 357$

So, $N/2 = 178.5$

Thus, the cumulative frequency just greater than 178.5 is 193 and the corresponding class is 19.5–24.5.

Therefore, 19.5–24.5 is the median class.

Here, $l = 19.5$, $f = 140$, $F = 193$ and $h = 5$

We know that

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

$$= 19.5 + \left(\frac{178.5 - 53}{140}\right) \times 5$$

$$= 19.5 + \frac{125.5}{140} \times 5$$

$$= 19.5 + \frac{125.5}{28}$$

$$= \frac{546 + 125.5}{28}$$

$$= 23.98$$

Hence, the median age 23.98 years.

Thus, nearly half the women were married between the age of 19.5 years and 24.5 years.

Statistics Ex 7.4 Q11

Answer :

Given: Median = 28.5

We prepare the cumulative frequency table, as given below.

Class interval:	Frequency: (f_i)	Cumulative frequency $(c.f.)$
0-10	5	5
10-20	f_1	$5+f_1$
20-30	20	$25+f_1$
30-40	15	$40+f_1$
40-50	f_2	$40+f_1+f_2$
50-60	5	$45+f_1+f_2$
	$N=60=45+f_1+f_2$	

Now, we have

$$N = 60$$

$$45 + f_1 + f_2 = 60$$

$$f_2 = 15 - f_1 \quad \text{.....(1)}$$

Also, $\frac{N}{2} = 30$

Since the median = 28.5 so the median class is 20−30.

Here, $l = 20, f = 20, F = 5 + f_1$ and $h = 10$

We know that

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

$$28.5 = 20 + \left\{\frac{30 - (5 + f_1)}{20}\right\} \times 10$$

$$8.5 = \frac{(25 - f_1) \times 10}{20}$$

$$8.5 \times 20 = 250 - 10 f_1$$

$$10 f_1 = 250 - 170$$

$$= 80$$

$$f_1 = 8$$

Putting the value of f_1 in (1), we get

$$f_2 = 15 - 8$$

$$= 7$$

Hence, the missing frequencies are 7 and 8.

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