Statistics Ex 7.1 Q8

Answer :

Given:

x_i	15	17	19	$20+p$	23
f_i	2	3	4	$5p$	6

Mean $=20$

First of all prepare the frequency table in such a way that its first column consist of the values of the variate (x_i) and the second column the corresponding frequencies (f_i).

Thereafter multiply the frequency of each row with corresponding values of variable to obtain third column containing $(f_i x_i)$.

Then, sum of all entries in the column second and denoted by $\sum f_i$ and in the third column to obtain $\sum f_i x_i$.

x_i	f_i	$f_i x_i$
15	2	30
17	3	51
19	4	76
$20+p$	$5p$	$5p(20+p)$
23	6	138
13	$\sum f_i = 15+5p$	$\sum f_i x_i = 295+5p(20+p)$

We know that mean, $\overline{X} = \dfrac{\sum f_i x_i}{\sum f_i}$

$$20 = \frac{295+5p(20+p)}{15+5p}$$

By using cross multiplication method,

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

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

$$\Rightarrow p^2 = 1$$

$$\Rightarrow p = 1$$

Hence, $p = \boxed{1}$

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