Statistics Ex 7.3 Q15

Answer :

Direct Method:

We may prepare the table as shown:

Size of the items	Mid value (x_i)	Frequency (f_i)	f_ix_i
1 – 4	2.5	6	15
4 – 9	6.5	12	78
9 – 16	12.5	26	325
16 – 27	21.5	20	430
		$\sum f_i = 64$	$\sum f_ix_i = 848$

We know that mean, $\overline{X} = \frac{\sum f_ix_i}{\sum f_i}$

$= \frac{848}{64}$

$= 13.25$

Hence, the mean is 13.25.

Short-Cut Method:

We may prepare the table as shown:

Size of Item	Mid value(x_i)	$d_i = x_i - A = x_i - 12.5$	Frequency(f_i)	f_id_i
1–4	2.5	−10	6	−60
4–9	6.5	−6	12	−72
9–16	**12.5 = A**	0	26	0
16–27	21.5	9	20	180
			$N = \sum f_i = 64$	$\sum f_id_i = 48$

Let the assumed mean be $A = 12.5$.

We know that mean, $\overline{X} = A + \frac{\sum f_id_i}{\sum f_i}$

$= 12.5 + \frac{48}{64}$

$= 12.5 + 0.75$

$= 13.25$

Hence, the mean is 13.25.

Step-deviation method cannot be used to evaluate the mean of the distribution as the width of the class intervals are not equal. Here, h is not fixed.

Statistics Ex 7.3 Q16

Answer :

Let the assumed mean be A = 1650 and h = 100.

Cost of living index :	Mid value (x_i):	No. of students: (f_i)	$d_i = x_i - A$ $= x_i - 1650$	$u_i = \frac{1}{h}(d_i)$ $= \frac{1}{100}(d_i)$	$f_i u_i$
1400 – 1500	1450	5	−200	−2	−10
1500 – 1600	1550	10	−100	−1	−10
1600 – 1700	1650	20	0	0	0
1700 – 1800	1750	9	100	1	9
1800 – 1900	1850	6	200	2	12
1900 – 2000	1950	2	300	3	6
		$\sum f_i = 52$			$\sum f_i u_i = 7$

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

Now, we have $N = \sum f_i = 52, \sum f_i u_i = 7,\ h = 100 \text{ and } A = 1650$.

Putting the values in the above formula, we have

$$\overline{X} = A + h\left(\frac{1}{N}\sum f_i u_i\right)$$

$$= 1650 + 100\left(\frac{1}{52} \times (7)\right)$$

$$= 1650 + \frac{700}{52}$$

$$= 1650 + 13.46$$

$$= 1663.46$$

Hence, the mean is 1663.46.

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