



Statistics Ex 7.5 Q14

Answer :

Consider the following table.

Number of letters	No. of surname	x_i	$f_i x_i$	C.f.
1-4	6	2.5	15	6
4-7	30	5.5	165	36
7-10	40	8.5	340	76
10-13	16	11.5	184	92
13-16	4	14.5	58	96
16-19	4	17.5	70	100
	$N = \sum f = 100$		$\sum f_i x_i = 832$	

Here, the maximum frequency is 40 so the modal class is 7-10.

Therefore,

$$l = 7$$

$$h = 3$$

$$f = 40$$

$$f_1 = 30$$

$$f_2 = 16$$

$$\begin{aligned}\Rightarrow \text{Mode} &= l + \frac{f - f_1}{2f - f_1 - f_2} \times h \\ &= 7 + \frac{10}{34} \times 3 \\ &= 7 + \frac{30}{34}\end{aligned}$$

$$\boxed{\text{Mode} = 7.88}$$

Thus, the modal sizes of the surnames is 7.88.

$$\begin{aligned}\text{Mean} &= \frac{\sum f_i x_i}{\sum f} \\ &= \frac{832}{100}\end{aligned}$$

$$\boxed{\text{Mean} = 8.32}$$

Thus, the mean number of letters in the surnames is 8.32.

Median

$$\begin{aligned} &= l + \frac{\frac{N}{2} - F}{f} \times h \\ &= 7 + \frac{50 - 36}{40} \times 3 \\ &= 7 + \frac{14}{40} \times 3 \\ &= 7 + \frac{21}{20} \end{aligned}$$

$$\boxed{\text{Median} = 8.05}$$

Thus, the median number of letters in the surnames is 8.05.

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