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Ex 15.2 Class 11 Maths Question 5.

x_i	92	93	97	98	102	104	109
f_i	3	2	3	2	6	3	3

Solution:

x_i	f_i	$f_i x_i$	$(x_i - 100)$	$(x_i - 100)^2$	$f_i(x_i - 100)^2$
92	3	276	−8	64	192
93	2	186	−7	49	98
97	3	291	−3	9	27
98	2	196	−2	4	8
102	6	612	2	4	24
104	3	312	4	16	48
109	3	327	9	81	243
	22	2200			640

$$\text{Mean } (\bar{x}) = \frac{1}{N}\sum_{i=1}^{n} f_i x_i = \frac{1}{22} \times 2200 = 100$$

$$\text{Variance } (\sigma^2) = \frac{1}{N}\sum_{i=1}^{n} f_i(x_i - \bar{x})^2$$

$$= \frac{1}{22} \times 640 = 29.09$$

Ex 15.2 Class 11 Maths Question 6.
Find the mean and standard deviation using short-cut method

x_i	60	61	62	63	64	65	66	67	68
f_i	2	1	12	29	25	12	10	4	5

Solution:

x_i	f_i	$u_i = x_i - 64$	$f_i u_i$	$f_i u_i^2$
60	2	−4	−8	32
61	1	−3	−3	9
62	12	−2	−24	48
63	29	−1	−29	29
64	25	0	0	0
65	12	1	12	12
66	10	2	20	40
67	4	3	12	36
68	5	4	20	80
	100		0	286

Let assumed mean $(A) = 64$

$$\text{Mean }(\bar{x}) = A + \frac{\Sigma f_i u_i}{N} = 64 + \frac{0}{100} = 64$$

$$\text{S.D. }(\sigma) = \frac{1}{N}\sqrt{N \Sigma f_i u_i^2 - (\Sigma f_i u_i)^2}$$

$$= \frac{1}{100}\sqrt{100 \times 286 - (0)^2}$$

$$= \frac{1}{100}\sqrt{28600} = \frac{1}{100} \times 169.1 = 1.69$$

Find the mean and variance for the following frequency distributions in Exercises 7 and 8.