

Q10. For the frequency distribution:

X	2	3	4	5	6	7
f	4	9	16	14	11	6

Find the standard deviation.

**Sol.**

$x_i$	$f_i$	$d_i = x_i - 4$	$f_i d_i$	$f_i d_i^2$
2	4	-2	-8	16
3	9	-1	-9	9
4	16	0	0	0
5	14	1	14	14
6	11	2	22	44
7	6	3	18	54
<b>Total</b>	$n = 60$		$\Sigma f_i d_i = 37$	$\Sigma f_i d_i^2 = 137$

$$\begin{aligned}\therefore \text{SD} &= \sqrt{\frac{\Sigma f_i d_i^2}{n} - \left(\frac{\Sigma f_i d_i}{n}\right)^2} = \sqrt{\frac{137}{60} - \left(\frac{37}{60}\right)^2} = \sqrt{2.2833 - (0.616)^2} \\ &= \sqrt{2.2833 - 0.3794} = \sqrt{1.9037} = 1.38\end{aligned}$$