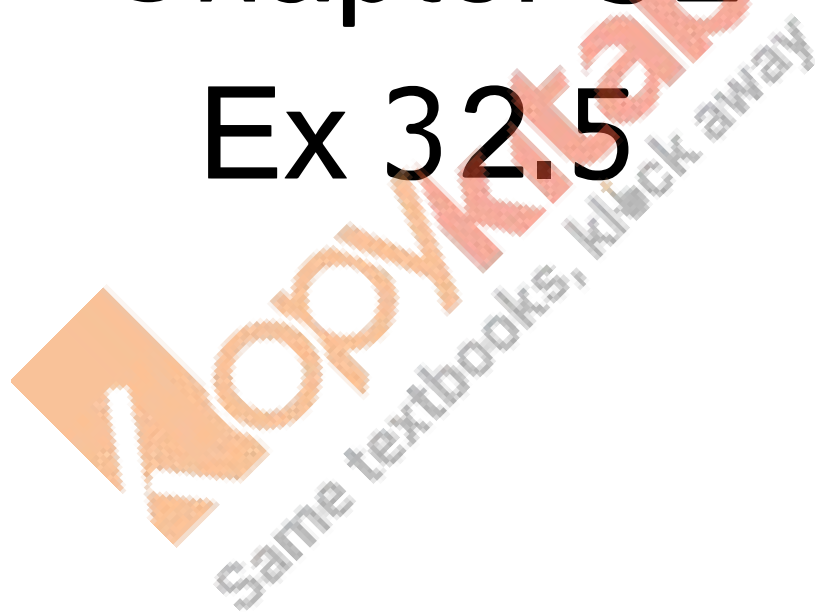


RD Sharma
Solutions
Class 11 Maths
Chapter 32
Ex 32.5



Statistics Ex 32.5 Q1

x	f	fx	$x-\text{mean}$	$(x-\text{mean})^2$	$f(x-\text{mean})^2$
4.5	1	4.5	-33.14	1098.45	1098.45
14.5	5	72.5	-23.14	535.59	2677.96
24.5	12	294	-13.14	172.73	2072.82
34.5	22	759	-3.14	9.88	217.31
44.5	17	756.5	6.86	47.02	799.35
54.5	9	490.5	16.86	284.16	2557.47
64.5	4	258	26.86	721.31	2885.22
	N=70	2635			12308.57

Here, $N = 70$, $\sum f_i x_i = 2635$

$$\therefore \bar{x} = \frac{1}{N} (\sum f_i x_i) = \frac{2635}{70} = 37.64$$

We have, $\sum f_i (x_i - \bar{x})^2 = 12308.57$

$$\therefore \text{var}(x) = \frac{1}{N} \left[\sum f_i (x_i - \bar{x})^2 \right] = \frac{12308.57}{70} = 175.84$$

$$S.D. = \sqrt{\text{var}(x)} = \sqrt{175.84} = 13.26$$

Statistics Ex 32.5 Q2

X	F	Fx	x-mean	F(x-mean)	(x-mean) ²	F(x-mean) ²
0	51	0	-6	-306	36	1836
1	203	203	-5	-1015	25	5075
2	383	766	-4	-1532	16	6128
3	525	1575	-3	-1575	9	4725
4	532	2128	-2	-1064	4	2128
5	408	2040	-1	-408	1	408
6	273	1638	0	0	0	0
7	139	973	1	139	1	139
8	43	344	2	86	4	172
9	27	243	3	81	9	243
10	10	100	4	40	16	160
11	4	44	5	20	25	100
12	2	24	6	12	36	72
	2600	10078		-5522		21186

Here, $N = 2600$, $\sum f_i x_i = 10078$

$$\therefore \bar{x} = \frac{1}{N} (\sum f_i x_i) = \frac{10078}{2600} = 3.88$$

Since ,

$$\text{var}(x) = h^2 \left(\frac{1}{N} \sum f_i (x - \text{mean})^2 - \left\{ \frac{1}{N} \sum f_i (x - \text{mean}) \right\}^2 \right)$$

$$\sigma^2 = 1 \left(\frac{21186}{2600} - \left(\frac{-5522}{2600} \right)^2 \right)$$

$$\sigma^2 = 8.14846 - 4.51072$$

$$\sigma^2 = \boxed{3.64}$$

Statistics Ex 32.5 Q3

i)

x_i	Cum. Freq	f_i	$f_i x_i$	$f_i x_i^2$
10	15	15	150	1500
20	32	17	340	6800
30	51	19	570	17100
40	78	27	1080	43200
50	97	19	950	47500
60	109	12	720	43200
		$N = 109$	Total = 3810	Total = 159300

$$Mean = \frac{3810}{109} = 34.95$$

$$Var = \frac{159300}{109} - (34.95)^2 = 239.96$$

$$SD = \sqrt{239.96} = 15.49$$

ii)

x_i	f_i	$f_i x_i$	$f_i x_i^2$
2	1	2	4
3	6	18	54
4	6	24	96
5	8	40	200
6	8	48	288
7	2	14	98
8	2	16	128
9	3	27	243
10	0	0	0
11	2	22	242
12	1	12	144
13	0	0	0
14	0	0	0
15	0	0	0
16	1	16	256

$$N = 40 \quad \text{Total} = 239 \quad \text{Total} = 1753$$

$$\text{Mean} = \frac{239}{40} = 5.975$$

$$\text{Var} = \frac{1753}{40} - (5.975)^2 = 8.12$$

$$SD = \sqrt{8.12} = 2.85$$

Statistics Ex 32.5 Q4

(i)

x	f	fx	x-mean	(x-mean) ²	f(x-mean) ²
3	7	21	-9.79	95.88	671.13
8	10	80	-4.79	22.96	229.60
13	15	195	0.21	0.04	0.65
18	10	180	5.21	27.13	271.26
23	6	138	10.21	104.21	625.26
	48	614			1797.92

Here, $N = 48$, and $\sum fx_i = 614$

$$\therefore \bar{x} = \frac{1}{N}(\sum fx_i) = \frac{614}{48} = 12.79$$

$$\sum f_i(x_i - \bar{x})^2 = 1797.92$$

$$\therefore \text{var}(x) = \frac{1}{N}[\sum f_i(x_i - \bar{x})^2] = \frac{1797.92}{48} = 37.46$$

$$S.D. = \sqrt{\text{var}(x)} = \sqrt{37.46} = 6.12$$

ii)

x_i	f_i	$f_i x_i^2$
2	4	16
3	9	81
4	16	256
5	14	350
6	11	396
7	6	294

$$N = 60 \quad \text{Total} = 1393$$

$$\text{Mean} = \frac{8 + 27 + 64 + 70 + 66 + 42}{60} = \frac{277}{60} = 4.62$$

$$\text{Var} = \frac{1393}{60} - (4.62)^2 = 1.88$$

$$SD = \sqrt{1.88} = 1.37$$