

Sample Questions

Question 1:

Find mean deviation about the mean

x_i	f_i
10	4
30	24
50	28
70	16
90	8

Solution :

x_i	f_i	$x_i f_i$	$ x_i - \bar{x} $	$f_i x_i - \bar{x} $
10	4	40	40	160
30	24	720	20	480
50	28	1400	0	0
70	16	1120	20	320
90	8	720	40	320
	80	4000		1280

$$N = 80$$

$$\bar{x} = \frac{\sum f_i x_i}{N}$$

$$= \frac{4000}{80}$$

$$= 50$$

$$\text{M.D}(\bar{x}) = \frac{\sum f_i |x_i - \bar{x}|}{N}$$

$$= \frac{1280}{80}$$

$$= \underline{\underline{16}}$$

Question 2:

Find mean deviation about the median

x	100-110	110-120	120-130	130-140	140-150
f	5	8	20	10	7

Solution :

x_i	f_i	cf	$ x_i - M $	$f x_i - M $
100-110	5	5	21	105
110-120	8	13	11	88
120-130	20	33	1	20
130-140	10	43	9	90
140-150	7	50	19	133
	50			436

$$N = 50 ; \frac{N}{2} = 25$$

Median class = 120-130

$$l = 120, C = 13, h = 10, f = 20$$

$$M = l + \frac{\left(\frac{N}{2} - C\right)}{f} \times h$$

$$M = 120 + \frac{(25 - 13)}{20} \times 10 = 126$$

$$\begin{aligned} \text{M.D}(M) &= \frac{\sum f_i |x_i - M|}{N} \\ &= \frac{436}{50} = \underline{\underline{8.72}} \end{aligned}$$

Question 3 :

Find mean , variance and S.D.

x	6	10	14	18	24	28	30
f	2	4	7	12	8	4	3

Solution :

x_i	f_i	$f_i x_i$	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$	$f_i (x_i - \bar{x})^2$
6	2	12	-13	169	338
10	4	40	-9	81	324
14	7	98	-5	25	175
18	12	216	1	1	12
24	8	192	5	25	200
28	4	112	9	81	324
30	3	90	11	121	363
	40	760			1736

$$\begin{aligned}\text{Mean } \bar{x} &= \frac{\sum f_i x_i}{N} \\ &= \frac{760}{40} = 19 \\ \text{Variance} &= \frac{\sum (x_i - \bar{x})^2}{N} \\ &= \frac{1736}{40} = \underline{43.4} \\ \text{S.D} &= \sqrt{43.4} = \underline{6.59}\end{aligned}$$

OR

x_i	x_i^2	f_i	$f_i x_i$	$f_i x_i^2$
6	36	2	12	72
10	100	4	40	400
14	196	7	98	1372
18	324	12	216	3888
24	576	8	192	4608
28	784	4	112	3136
30	900	3	90	2700
		40	760	16176

$$\begin{aligned}\text{Variance} &= \frac{\sum f_i x_i^2}{N} - \left(\frac{\sum f_i x_i}{N} \right)^2 \\ &= \frac{16176}{40} - \left(\frac{760}{40} \right)^2 \\ \text{S.D} &= 404.4 - 361 = \underline{43.4} \\ \text{S.D} &= \sqrt{43.4} = \underline{6.59}\end{aligned}$$

EXERCISE

1.

Find the M.D about mean.

x	2	5	6	8	10	12
f	2	8	10	7	8	5

(March 2016)

Hint or Answer: 2.3

2.

Calculate mean, variance and s.d.

x	0-10	10-20	20-30	30-40	40-50
f	5	8	15	16	6

(Imp 2015)

Hint or Answer: 27,132,11.5

3.

Find the s.d.

x	3	8	13	18	23
f	7	10	15	10	6

(Imp 2014, March 2015)

Hint or Answer: 6.1

4.

Find mean, variance and s.d.

x	30-40	40-50	50-60	60-70	70-80	80-90	90-100
f	3	7	12	15	8	3	2

(March 2014)

Hint or Answer: 62,201,14.18

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