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DS  
12/12/2021

## Tutorial + Lab Exercise 1

Find the mean deviation about the mean for the data in Exercise 1 and 2

1. 4, 7, 8, 9, 10, 12, 13, 17

$$\text{Mean} = \frac{4+7+8+9+10+12+13+17}{8}$$

$$= \frac{80}{8}$$

$$= 10$$

Mean deviation =

The deviation of the respective observation from the mean

$\bar{x}$  i.e  $x_i - \bar{x}$  are

$$4-10, 7-10, 8-10, 9-10, 10-10, 12-10, 13-10, \\ 17-10$$

Step 3

The absolute values of the deviation i.e  $|x_i - \bar{x}|$  are

$$6, 3, 2, 1, 0, -2, -3, -7$$

Step 4: The required mean deviation about mean is

$$MD(\bar{x}) = \frac{\sum_{i=1}^8 |x_i - \bar{x}|}{8}$$

~~$= 4+7+8+9+10+12$~~

$= \frac{6+3+2+1+0-2-3-7}{8}$

$= \frac{24}{8}$

$= 3$

2.  $38, 70, 48, 40, 42, 55, 63, 46, 54, 44$

$$\text{Mean} = \frac{38 + 70 + 48 + 40 + 42 + 55 + 63 + 46 + 54 + 44}{10}$$
$$= \frac{500}{10}$$
$$= 50$$

Mean deviation

The deviation of the respective observation from the mean

$\bar{x}$  i.e  $x_i - \bar{x}$  are

$38 - 50, 70 - 50, 48 - 50, 40 - 50, 42 - 50, 55 - 50, 63 - 50, 46 - 50,$   
 $54 - 50, 44 - 50$

Step 3

The absolute values of the deviation i.e  $|x_i - \bar{x}|$  are

$12, 20, 2, 10, 8, 5, -13, 4, -4, 6$

Step 4 : The required mean deviation about mean is

$$MD(\bar{x}) = \frac{\sum_{i=1}^8 |x_i - \bar{x}|}{10}$$
$$= \frac{12 + 20 + 2 + 10 + 8 + 5 + 13 + 4 + 4 + 6}{10}$$
$$= 8.4$$

mean of most performed students is to calculate the

$$\text{sum } |\bar{x} - x_i| \text{ s.i. } \bar{x}$$

$$02-44, 02-88, 02-22, 02-24, 02-04, 02-84, 02-05, 02-88$$
$$02-44, 02-24$$

8.gst2.

sum  $|\bar{x} - x_i|$  s.i. calculate the sum of students is

$$4, 4, 4, 8, 8, 2, 8, 01, 8, 02, 8$$

3. Find the mean deviation about the median

13, 17, 16, 14, 11, 13, 10, 16, 11, 18, 12, 17

$$n = 12$$

$$\text{median} = \frac{\text{th} + \text{th}}{2} = \frac{13 + 14}{2} = 13.5$$

$$|x_i - M|$$

$$13 \quad 0.5$$

$$17 \quad 3.5$$

$$16 \quad 2.5$$

$$14 \quad 0.5$$

$$11 \quad 2.5$$

$$13 \quad 0.5$$

$$10 \quad 3.5$$

$$16 \quad 2.5$$

$$11 \quad 4.5 \quad 2.5$$

$$18 \quad 5 \quad 4.5$$

$$12 \quad 1.5$$

$$17 \quad \frac{3.5}{28}$$

$$\text{mean deviation} = \frac{28}{12} = 3$$

4. 36, 72, 46, 42, 60, 45, 53, 46, 51, 49

$$\text{Median} = \left( \frac{10}{2} \right) \rightarrow \left( \frac{10}{2} + 1 \right)$$

$\text{th}$        $\text{th}$   
5      & 6

$$M = 47.5$$

$$|x_i - M|$$

36	11.5	$ M - x_i $
72	24.5	2.0
46	1.5	2.8
42	5.5	2.6
60	12.5	2.0
45	3.5 2.5	2.2
53	1.5 5.5	2.0
46	1.5	2.8
51	3.5	2.8
49	1.5	2.6 2.4
	$\frac{70}{10}$	2.4 2.1

$$\text{mean deviation about } m : \frac{70}{10} = 7$$

$$S = \frac{82}{10} = \text{mean deviation}$$

Q. Find the mean deviation about the mean

$x_i$	5	10	15	20	25	30	35	40	45	50
$f_i$	7	4	6	3	5	0	0	0	0	0

$$N = \sum f_i = 25$$

$$\bar{x} = \frac{35 + 40 + 90 + 60 + 125}{25} = \frac{350}{25} = 14$$

$$(x_i - \bar{x}) \quad f_i(x_i - \bar{x})$$

5	9	63
10	4	16
15	1	6
20	6	18
25	11	55

$$\overline{158}$$

$$\text{mean deviation about mean} = \frac{158}{25} = 6.32$$

$$vi) \quad x_i \quad 10 \quad 30 \quad 50 \quad 70 \quad 90$$

$$f_i \quad 4 \quad 24 \quad 28 \quad 16 \quad 8$$

$$N = \sum f_i = 80$$

$$\bar{x} = \frac{40 + 720 + 1400 + 1120 + 720}{80} = \frac{4000}{80} = 50$$

$ x_i - \bar{x} $	$f_i  x_i - \bar{x} $
10	40
30	20
50	0
70	20
90	40
	<u>320</u>
	<u>320</u>
	<u>1200</u>

mean deviation about mean =  $\frac{1280}{80} = 16$

Q) Find the mean deviation about the median

vii) $x_i$	5	7	9	10	12	15
$f_i$	8	6	2	2	2	6

$$\sum f_i = 26$$

m: 13 & 14 mean = 7

$$|x_i - \bar{x}|$$

5	2	16
7	0	0
9	2	48
10	3	6
12	5	10
15	8	48

$$= \frac{84}{26} = 3.2$$

mean deviation about median =  $\frac{84}{26} = 3.23$

viii)	$x_i$	15	21	27	30	35
	$f_i$	3	5	6	7	8

$$N = \sum f_i = 29$$

$$M = 15^{\text{th}} = 30$$

$ x_i - M $	$f_i  x_i - M $
15	15
21	7
27	3
30	0
35	5
	<u>138</u>

mean deviation about median =  $\frac{84}{29} = 2.86$

Q) Find mean deviation about the mean

Income per day	no of persons	$x_i$	$x_i - \bar{x}$	$f_i (x_i - \bar{x})$
0 - 100	4	50	308	1232
100 - 200	8	150	208	1664
200 - 300	9	250	108	972
300 - 400	10	350	8	80
400 - 500	7	450	92	644
500 - 600	5	550	192	960
600 - 700	4	650	292	1168
700 - 800	3	750	392	1176

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i} = \frac{17900}{50}$$

= 358

$$\text{mean deviation about mean} = \frac{\sum (x_i - \bar{x}) f_i}{50}$$

$$= \frac{7896}{50}$$

$$= 157.92$$

x) Height (in cm)	No of boys	$x_i$	$x_i f_i$	$ x_i - \bar{x} $
95 - 105	9	100	900	227.7
105 - 115	13	110	1430	198.9
115 - 125	26	120	3120	137.8
125 - 135	30	130	3900	141.
135 - 145	12	140	1680	176.4
145 - 155	10	150	1500	247
	100	$\sum x_i f_i = 12530$	90	1128.8

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i} = \frac{12530}{100} = 125.3$$

$$\text{mean deviation about mean} = \frac{\sum (x_i - \bar{x})}{\sum f}$$

$$= \frac{1128.8}{100}$$

$$= 11.288$$

~~1/12~~  
Name : Aniruddh Kulkarni Lab Exercise 1 (R programming)

Results from R

- (i) mean deviation about mean = 3
- (ii) mean deviation about mean = 8.4
- (iii) mean deviation about median = 2.33
- iv) mean deviation about median = 7
- v) mean deviation about mean = 6.32
- vi) mean deviation about mean = 16
- vii) mean deviation about median = 3.2307
- viii) mean deviation about median = 6.103448
- ix) mean deviation about mean = 157.92
- x) mean deviation about mean = 11.288

$$\text{mean} = 42.5 + \frac{25}{100} \times 4$$

$$= 43.5$$

$$\gamma = \frac{4}{100} \sqrt{100 \times 199 - (25)^2}$$

$$= \frac{1}{25} \sqrt{19275}$$

$$= 5.5532$$

$5.5532 = \text{anisham tude naitarsh nasm (v)}$

$5.5532 = \text{anisham tude naitarsh nasm (iv)}$

$5.5532 = \text{anisham tude naitarsh nasm (iii)}$

$8.44841 \cdot d = \text{anisham tude naitarsh nasm (ii)}$

$8.44841 = \text{anisham tude naitarsh nasm (i)}$

$8.44841 = \text{anisham tude naitarsh nasm (x)}$