

4. MEDIDAS DE DISPERSIÓN

4.1. DESVIO MEDIO:

4.1.1. Para datos simples

Su símbolo es DM que se calcula como el promedio de los valores absolutos de los desvíos desde la media, mediana y moda

Ejercicio

Y_i	d	d_{Mdn}	d_{Mo}
4	-20.53	-18	-21
5	-19.53	-17	-20
6	-18.53	-16	-19
8	-16.53	-14	-17
18	-6.53	-4	-7
19	-5.53	-3	-6
20	-4.53	-2	-5
22	-2.53	0	-3
23	-1.53	1	-2
24	-0.53	2	-1
25	0.47	3	-0
25	0.47	3	0
48	23.47	26	23
60	35.47	38	35
61	36.47	39	36
368	192.65	186	195
$\sum Y_i$	$\sum d $	$\sum d_{Mdn} $	$\sum d_{Mo} $

$$1. DM = \frac{\sum |d_{\bar{x}}|}{n} = \frac{192.65}{15} = 12.84$$

$$d_{\bar{x}} = Y_i - \bar{X}$$

$$2. DM_{Mdn} = \frac{\sum |d_{Mdn}|}{n} = \frac{186}{15} = 12.4$$

$$d_{Mdn} = Y_i - Mdn$$

$$3. DM_{Mo} = \frac{\sum |d_{Mo}|}{n} = \frac{195}{15} = 13$$

$$d_{Mo} = Y_i - Mo$$

Los valores absolutos no se considera los signos.
Como se calcula el desvío.

$$d_{\bar{x}} = Y_i - \bar{X} \Rightarrow DM_{\bar{x}} = \frac{\sum |d_{\bar{x}}|}{n} = \frac{192.65}{15} = 12.84$$

Se hace lo mismo con la Mediana y la Moda

4.1.2. PARA DATOS PONDERADOS

$$1) DM = \frac{\sum |nid_{\bar{x}}|}{n}$$

$$2) DM_{Mdn} = \frac{\sum |nid_{Mdn}|}{n}$$

$$3) DM_{Mo} = \frac{\sum |nid_{Mo}|}{n}$$

Y_i	n_i	$Y_i n_i$	$ d $	$ dn_i $	N_i	$ d_{Mdn} $	$ n_i d_{Mdn} $	$ d_{Mo} $	$ n_i d_{Mo} $
3	3	9	13,5	40,6	3	13	39	20	60
4	8	32	12,5	100	11	12	96	19	152
5	15	75	11,5	173	26	11	165	18	270
8	25	200	8,52	213	51	8	200	15	375
10	26	260	6,52	170	77	6	156	13	338
12	30	360	4,52	136	107	4	120	11	330
13	31	403	3,52	109	138	3	93	10	310
14	32	448	2,52	80,8	170	2	64	9	288
15	36	540	1,52	54,9	206	1	36	8	288
16	41	656	0,52	21,5	247	0	0	7	287
17	42	714	0,48	20	289	1	42	6	252
18	40	720	1,48	59	329	2	80	5	200
21	40	840	4,48	179	369	5	200	2	80
23	48	1104	6,48	311	417	7	336	0	0
26	31	806	9,48	294	448	10	310	3	93
30	10	300	13,5	135	458	14	140	7	70
38	3	114	21,5	64,4	461	22	66	15	45
53	1	53	36,5	36,5	462	37	37	30	30
	462	7634		2196,76			2180		3468
	n	$\sum Y_i n_i$		$\sum dn_i$			$\sum n_i d_{Mdn}$		$\sum n_i d_{Mo}$

$$\bar{X} = \frac{\sum n_i Y_i}{n} \quad \bar{X} = \frac{7634}{462} = 16.52$$

$$DM = \frac{\sum |n_i d_{\bar{X}}|}{n} \quad DM = \frac{2196,76}{462} = 4.75$$

$$Pos Mdn = \frac{n+1}{2} = \frac{462+1}{2} = 231. \quad Mdn = 16$$

$$DM_{Mdn} = \frac{\sum |n_i d_{Mdn}|}{n} \quad DM_{Mdn} = \frac{2180}{462} = 4.72$$

$$Mo = 23$$

$$DM_{Mo} = \frac{\sum |n_i d_{Mo}|}{n} \quad DM_{Mo} = \frac{3468}{462} = 7.51$$

4.1.3.Desviación media para datos agrupados en intervalos

INTERVALOS	Y_i	n_i	$Y_i n_i$	N_i	$ d $	$ dn_i $	$ d_{Mdn} $	$ n_i d_{Mdn} $	$ d_{Mo} $	$ n_i d_{Mo} $
125 - 129	127	3	381	163	23,25	69,75	22,19	66,56	21,45	64,34
120 - 124	122	4	488	160	18,25	73,01	17,19	68,75	16,45	65,79
115 - 119	117	12	1404	156	13,25	159,02	12,19	146,25	11,45	137,37
110 - 114	112	25	2800	144	8,25	206,29	7,19	179,69	6,45	161,18
105 - 109	107	40	4280	119	3,25	130,06	2,19	87,50	1,45	57,89
100 - 104	102	36	3672	79	1,75	62,94	2,81	101,25	3,55	127,89
95 - 99	97	12	1164	43	6,75	80,98	7,81	93,75	8,55	102,63
90 - 94	92	13	1196	31	11,75	152,73	12,81	166,56	13,55	176,18
85 - 89	87	10	870	18	16,75	167,48	17,81	178,13	18,55	185,53
80 - 84	82	8	656	8	21,75	173,99	22,81	182,50	23,55	188,42
5		163	16911			1276,258		1270,938		1267,237
c						$\Sigma nid $		$\Sigma nid_{Mdn} $		$\Sigma nid_{Mo} $

$$\bar{X} = \frac{\sum n_i Y_i}{n} \quad \bar{X} = \frac{16911}{163} \quad 103.75$$

$$DM = \frac{\sum |n_i d_{\bar{x}}|}{n} \quad DM = \frac{1276.26}{163} = 7.83$$

$$M_{dn} = Y_{i-1} + \left(\frac{n/2 - N_{i-1}}{n} \right) c \quad M_{dn} = 104.5 + \left(\frac{81.5 - 79}{40} \right) 5 \quad 104.81$$

$$Pos Mdn = \frac{n}{2} = \frac{163}{2} \quad 81.5$$

$$DM_{Mdn} = \frac{\sum |n_i d_{Mdn}|}{n} \quad DM_{Mdn} = \frac{1270.94}{163} = 7.80$$

$$M_o = Y_{i-1} + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2} \right) c = 104.5 + \left(\frac{4}{4 + 15_2} \right) 5 \quad 105.55$$

$$DM_{Mo} = \frac{\sum |n_i d_{Mo}|}{n} \quad DM_{Mo} = \frac{1267.24}{163} = 7.77$$