Module 2
Statistics

What this module is about

This module is about finding the measures of central tendency of grouped data. As you go over this material, you will develop the skills in computing the mean, median and mode of grouped data.

What you are expected to learn

This module is designed for you to find the measures of central tendency using grouped data. Specifically, you are to find the mean, median and mode of grouped data.

How much do you know

Use the frequency distribution table below to answer the questions.

Scores of Students in a Mathematics Test

Class	Frequency
46 – 50	1
41 – 45	2
36 – 40	2
31 – 35	3
26 – 30	7
21 – 25	10
16 – 20	13
11 – 15	6
6 – 10	4
1 – 5	2

1. What is the class size?
2. What is the class mark of the class with the highest frequency?
3. What is $\sum fX$?
4. Find the mean score.
5. What is the median class?

6. Determine the cumulative frequency of the median class.
7. Solve for the median score.
8. What is the modal class?
9. Determine the lower boundary of the modal class
10. Compute for the modal score.

What you will do

Lesson 1

The Mean of Grouped Data Using the Class Marks

When the number of items in a set of data is too big, items are grouped for convenience. The manner of computing for the mean of grouped data is given by the formula:

$$\text{Mean} = \frac{\sum(fX)}{\sum f}$$

where: f is the frequency of each class
X is the class mark of class

The Greek symbol $\sum$ (sigma) is the mathematical symbol for summation. This means that all items having this symbol are to be added. Thus, the symbol $\sum f$ means the sum of all frequencies, and $\sum fX$ means the sum of all the products of the frequency and the corresponding class mark.

Examples:

Compute the mean of the scores of the students in a Mathematics IV test.

Class	Frequency
46 – 50	1
41 – 45	5
36 – 40	11
31 – 35	12
26 – 30	11
21 – 25	5
16 – 20	2
11 – 15	1

The frequency distribution for the data is given below. The columns X and fX are added.

Class	f	X	fX
46 – 50	1	48	48
41 – 45	5	43	215
36 – 40	11	38	418
31 – 35	12	33	396
26 – 30	11	28	308
21 – 25	5	23	115
16 – 20	2	18	36
11 – 15	1	13	13

$$\sum f = 48$$

$$\sum fX = 1{,}549$$

$$\text{Mean} = \frac{\sum(fX)}{\sum f}$$

$$\text{Mean} = \frac{1{,}549}{48}$$

$$\text{Mean} = 32.27$$

The mean score is 32.27.

Solve for the mean gross sale of Aling Mely's Sari-sari Store for one month.

Sales in Pesos	Frequency
4,501 – 5,000	3
4,001 – 4,500	4
3,501 – 4,000	6
3,001 – 3,500	5
2,501 – 3,000	7
2,001 – 2,500	3
1,501 – 2,000	1
1,001 – 1,500	1

The frequency distribution for the data is given below. The columns X and fX are added.

Sales in Pesos	f	X	fX
1,001 – 1,500	1	1,250	1,250
1,501 – 2,000	1	1,750	1,750
2,001 – 2,500	3	2,250	6,750
2,501 – 3,000	7	2,750	19,250
3,001 – 3,500	5	3,250	16,250
3,501 – 4,000	6	3,750	22,500
4,001 – 4,500	4	4,250	17,000
4,501 – 5,000	3	4,750	14,250

$$\sum f = 30$$
$$\sum fX = 99{,}000$$
$$\text{Mean} = \frac{\sum(fX)}{\sum f}$$
$$\text{Mean} = \frac{99{,}000}{30}$$
$$\text{Mean} = 3{,}300$$

The mean gross sale is P3, 300.

Try this out

Solve for the mean of each grouped data using the class marks.
Set A

1. Scores of Diagnostic Test of IV-Narra Students

Score	Frequency
36 – 40	1
31 – 35	10
26 – 20	10
21 – 25	16
16 – 20	9
11 – 15	4

2. Height of IV-1 and IV-2 Students

Height in cm	Frequency
175 – 179	2
170 – 174	5
165 – 169	8
160 – 164	11
155 – 159	21
150 – 154	14
145 – 169	17
140 – 144	2

3. Midyear Test Scores of IV-Newton

Score	Frequency
41 – 45	1
36 – 40	8
31 – 35	8
26 – 30	14
21 – 25	7
16 – 20	2

4. Ages of San Lorenzo High School Teachers

Age	Frequency
21 – 25	5
26 – 30	8
31 – 35	8
36 – 40	11
41 – 45	15
46 – 50	14
51 – 55	12
56 – 60	5
61 – 65	2

5. Pledges to the Victims of Typhoon Mulawin

Pledges in Pesos	Frequency
9,000 – 9,999	4
8,000 – 8,999	12
7,000 – 7,999	13
6,000 – 6,999	15
5,000 – 5,999	19
4,000 – 4,999	30
3,000 – 3,999	21
2,000 – 2,999	41
1,000 – 1,999	31
0 – 999	14

Set B

1. Scores of Periodic Test of IV-Molave Students

Score	Frequency
46 – 50	2
41 – 45	9
36 – 40	13
31 – 35	11
26 – 30	10
21 – 25	5

2. Height of IV-2 Students

Height in cm	Frequency
175 – 179	3
170 – 174	4
165 – 169	10
160 – 164	9
155 – 159	24
150 – 154	11
145 – 169	13
140 – 144	6

3. Midyear Test Scores of Students in English

Class	Frequency
91 – 95	1
86 – 90	6
81 – 85	7
76 – 80	4
71 – 75	7
66 – 70	12
61 – 65	5
56 – 80	5
51 – 55	1
46 – 50	2

4. Ages of Sta. Barbara High School Teachers

Class	Frequency
21 – 25	4
26 – 30	14
31 – 35	15
36 – 40	11
41 – 45	12
46 – 50	10
51 – 55	9
56 – 60	3
61 – 65	3

5. Monthly Income of the Families of Fourth Year Students

Income in Pesos	Frequency
9,000 – 9,999	18
8,000 – 8,999	22
7,000 – 7,999	33
6,000 – 6,999	56
5,000 – 5,999	50
4,000 – 4,999	31

Set C

1. Scores of Achievement Test in Filipino of IV-Kamagong Students

Score	Frequency
86 – 90	2
81 – 85	9
76 – 80	8
71 – 75	13
66 – 60	12
61 – 65	6

2. Weight of First Year Students

Weight in kg	Frequency
75 – 79	1
70 – 74	4
65 – 69	10
60 – 64	14
55 – 59	21
50 – 54	15
45 – 69	14
40 – 44	1

3. Final Test Scores of IV-Rizal

Score	Frequency
91 – 95	1
86 – 90	5
81 – 85	9
76 – 80	16
71 – 75	6
66 – 70	3

4. Ages of Seniro Factory Employees

Age	Frequency
21 – 25	8
26 – 30	18
31 – 35	11
36 – 40	16
41 – 45	12
46 – 50	10
51 – 55	2
56 – 60	2
61 – 65	1

5. Average Grades of Students of Engineering Block in the First Semester

Average Grade	Frequency
1.01 – 1.50	4
1.51 – 2.00	10
2.01 – 2.50	18
2.51 – 3.00	26
3.01 – 3.50	24
3.51 – 4.00	16
4.01 – 4.50	7
4.51 – 5.00	5

Lesson 2

The Mean of Grouped Data Using the Coded Deviation

An alternative formula for computing the mean of grouped data makes use of coded deviation:

$$\text{Mean} = \text{A.M.} + \left[\frac{\sum(\text{fd})}{\sum \text{f}}\right]\text{i}$$

where: A.M. is the assumed mean
f is the frequency of each class
d is the coded deviation from A.M.
i is the class interval

Any class mark can be considered as assumed mean. But it is convenient to choose the class mark with the highest frequency. The class chosen to contain A.M. is given a 0 deviation.

Subsequently, consecutive positive integers are assigned to the classes upward and negative integers to the classes downward.

This is illustrated in the next examples using the same data in lesson 1.

Examples:

Compute the mean of the scores of the students in a Mathematics IV test.

Class	Frequency
46 – 50	1
41 – 45	5
36 – 40	11
31 – 35	12
26 – 30	11
21 – 25	5
16 – 20	2
11 – 15	1

The frequency distribution for the data is given below. The columns X, d and fd are added.

Class	f	X	d	fd
46 – 50	1	48	3	3
41 – 45	5	43	2	10
36 – 40	11	38	1	11
31 – 35	**12**	**33**	**0**	**0**
26 – 30	11	28	-1	-11
21 – 25	5	23	-2	-10
16 – 20	2	18	-3	-6
11 – 15	1	13	-4	-4

A.M. = 33

$\sum f = 48$

$\sum fd = -7$

i = 5

$$\text{Mean} = \text{A.M.} + \left[\frac{\sum(fd)}{\sum f}\right] i$$

$$\text{Mean} = 33 + \left[\frac{-7}{48}\right](5)$$

Mean = 33 + (-0.73)
Mean = 32.27

The mean score is 32.27.

Solve for the mean gross sale of Aling Mely's Sari-sari Store for one month.

Sales in Pesos	Frequency
1,001 – 1,500	1
1,501 – 2,000	1
2,001 – 2,500	3
2,501 – 3,000	7
3,001 – 3,500	5
3,501 – 4,000	6
4,001 – 4,500	4
4,501 – 5,000	3

The frequency distribution for the data is given below. The columns X, d and fd are added.

Sales in Pesos	f	X	d	fd
1,001 – 1,500	1	1,250	-3	-3
1,501 – 2,000	1	1,750	-2	-2
2,001 – 2,500	3	2,250	-1	-3
2,501 – 3,000	**7**	**2,750**	**0**	**0**
3,001 – 3,500	5	3,250	1	5
3,501 – 4,000	6	3,750	2	12
4,001 – 4,500	4	4,250	3	12
4,501 – 5,000	3	4,750	4	12

A.M. = 2,750
$\sum f = 30$
$\sum fd = 33$
i = 500

$$\text{Mean} = \text{A.M.} + \left[\frac{\sum(\text{fd})}{\sum \text{f}}\right]\text{i}$$

$$\text{Mean} = 2,750 + \left[\frac{33}{30}\right](500)$$

Mean = 2,750 + 550
Mean = 3,300

The mean gross sale is P3,300.

Try this out

Solve for the mean of each grouped data using coded deviation.

Set A

1. Scores of Diagnostic Test of IV-Narra Students

Score	Frequency
36 – 40	1
31 – 35	10
26 – 20	10
21 – 25	16
16 – 20	9
11 – 15	4

2. Height of IV-1 and IV-2 Students

Height in cm	Frequency
175 – 179	2
170 – 174	5
165 – 169	8
160 – 164	11
155 – 159	21
150 – 154	14
145 – 169	17
140 – 144	2

3. Midyear Test Scores of IV-Newton

Score	Frequency
41 – 45	1
36 – 40	8
31 – 35	8
26 – 30	14
21 – 25	7
16 – 20	2

4. Ages of San Lorenzo High School Teachers

Age	Frequency
21 – 25	5
26 – 30	8
31 – 35	8
36 – 40	11
41 – 45	15
46 – 50	14
51 – 55	12
56 – 60	5
61 – 65	2

5. Pledges to the Victims of Typhoon Mulawin

Pledges in Pesos	Frequency
9,000 – 9,999	4
8,000 – 8,999	12
7,000 – 7,999	13
6,000 – 6,999	15
5,000 – 5,999	19
4,000 – 4,999	30
3,000 – 3,999	21
2,000 – 2,999	41
1,000 – 1,999	31
0 – 999	14

Set B

1. Scores of Periodic Test of IV-Molave Students

Score	Frequency
46 – 50	2
41 – 45	9
36 – 40	13
31 – 35	11
26 – 30	10
21 – 25	5

2. Height of IV-2 Students

Height in cm	Frequency
175 – 179	3
170 – 174	4
165 – 169	10
160 – 164	9
155 – 159	24
150 – 154	11
145 – 169	13
140 – 144	6

3. Midyear Test Scores of Students in English

Class	Frequency
91 – 95	1
86 – 90	6
81 – 85	7
76 – 80	4
71 – 75	7
66 – 70	12
61 – 65	5
56 – 80	5
51 – 55	1
46 – 50	2

4. Ages of Sta. Barbara High School Teachers

Class	Frequency
21 – 25	4
26 – 30	14
31 – 35	15
36 – 40	11
41 – 45	12
46 – 50	10
51 – 55	9
56 – 60	3
61 – 65	2

5. Monthly Income of the Families of Fourth Year Students

Income in Pesos	Frequency
9,000 – 9,999	18
8,000 – 8,999	22
7,000 – 7,999	33
6,000 – 6,999	56
5,000 – 5,999	50
4,000 – 4,999	31

Set C

1. Scores of Achievement Test in Filipino of IV-Kamagong Students

Score	Frequency
86 – 90	2
81 – 85	9
76 – 80	8
71 – 75	13
66 – 60	12
61 – 65	6

2. Weight of First Year Students

Weight in kg	Frequency
75 – 79	1
70 – 74	4
65 – 69	10
60 – 64	14
55 – 59	21
50 – 54	15
45 – 69	14
40 – 44	1

3. Final Test Scores of IV-Rizal

Score	Frequency
91 – 95	1
86 – 90	5
81 – 85	9
76 – 80	16
71 – 75	6
66 – 70	3

4. Ages of Seniro Factory Employees

Age	Frequency
21 – 25	8
26 – 30	18
31 – 35	11
36 – 40	16
41 – 45	12
46 – 50	10
51 – 55	2
56 – 60	2
61 – 65	1

5. Average Grades of Students of Engineering Block in the First Semester

Average Grade	Frequency
1.01 – 1.50	4
1.51 – 2.00	10
2.01 – 2.50	18
2.51 – 3.00	26
3.01 – 3.50	24
3.51 – 4.00	16
4.01 – 4.50	7
4.51 – 5.00	5

Lesson 3

The Median of Grouped Data

The median is the middle value in a set of quantities. It separates an ordered set of data into two equal parts. Half of the quantities found above the median and the other half is found below it.

In computing for the median of grouped data, the following formula is used:

$$\text{Median} = \text{lb}_{\text{mc}} + \left[\frac{\frac{\sum \text{f}}{2} - \text{cf}}{\text{f}_{\text{mc}}} \right] \text{i}$$

where: lb_{mc} is the lower boundary of the median class
f is the frequency of each class
cf is the cumulative frequency of the lower class next to the median class

f_{mc} is the frequency of the median class
i is the class interval

The median class is the class that contains the $\frac{\sum f}{2}^{th}$ quantity. The computed median must be within the median class.

Examples:

1. Compute the median of the scores of the students in a Mathematics IV test.

Class	Frequency
46 – 50	1
41 – 45	5
36 – 40	11
31 – 35	12
26 – 30	11
21 – 25	5
16 – 20	2
11 – 15	1

The frequency distribution for the data is given below. The columns for lb and "less than" cumulative frequency are added.

Class	f	lb	"<" cf
46 – 50	1	45.5	48
41 – 45	5	40.5	47
36 – 40	11	35.5	42
31 – 35	**12**	**30.5**	**31**
26 – 30	11	25.5	19
21 – 25	5	20.5	8
16 – 20	2	15.5	3
11 – 15	1	10.5	1

Since $\frac{\sum f}{2} = \frac{48}{2} = 24$, the 24^{th} quantity is in the class 31 – 35. Hence, the median class is 31 – 35.

$lb_{mc} = 30.5$
$\sum f = 48$
$cf = 19$
$f_{mc} = 12$
$i = 5$

$$\text{Median} = \text{lb}_{mc} + \left[\frac{\frac{\sum f}{2} - cf}{f_{mc}}\right] i$$

$$\text{Median} = 30.5 + \left[\frac{\frac{48}{2} - 19}{12}\right] (5)$$

$$\text{Median} = 30.5 + 2.08$$

Median = 32.58

The median score is 32.58.

2. Solve for the median gross sale of Aling Mely's Sari-sari Store for one month.

Sales in Pesos	Frequency
1,001 – 1,500	1
1,501 – 2,000	1
2,001 – 2,500	3
2,501 – 3,000	7
3,001 – 3,500	5
3,501 – 4,000	6
4,001 – 4,500	4
4,501 – 5,000	3

The frequency distribution for the data is given below. The columns for lb and "less than" cumulative frequency are added.

Sales in Pesos	f	lb	"<" cf
1,001 – 1,500	1	1,000.5	1
1,501 – 2,000	1	1,500.5	2
2,001 – 2,500	3	2,000.5	5
2,501 – 3,000	7	2,500.5	12
3,001 – 3,500	**5**	**3,000.5**	**17**
3,501 – 4,000	6	3,500.5	23
4,001 – 4,500	4	4,000.5	27
4,501 – 5,000	3	4,500.5	30

Since $\frac{\sum f}{2} = \frac{30}{2} = 15$, the 15th quantity is in the class 3,001 – 3,500.

Hence, the median class is 3,001 – 3,500.

lb_{mc} = 3,000.5

$\sum f$ = 30

cf = 12

f_{mc} = 5

i = 500

$$\text{Median} = lb_{mc} + \left[\frac{\frac{\sum f}{2} - cf}{f_{mc}} \right] i$$

$$\text{Median} = 3,000.5 + \left[\frac{\frac{30}{2} - 12}{5} \right] (500)$$

Median = 3,000.5 + 300

Median = 3,300.5

The median score is 3,300.5.

Try this out

Solve for the median of each grouped data using coded deviation.

Set A

1. Scores of Diagnostic Test of IV-Narra Students

Score	Frequency
36 – 40	1
31 – 35	10
26 – 20	10
21 – 25	16
16 – 20	9
11 – 15	4

2. Height of IV-1 and IV-2 Students

Height in cm	Frequency
175 – 179	2
170 – 174	5
165 – 169	8
160 – 164	11
155 – 159	21
150 – 154	14
145 – 169	17
140 – 144	2

3. Midyear Test Scores of IV-Newton

Score	Frequency
41 – 45	1
36 – 40	8
31 – 35	8
26 – 30	14
21 – 25	7
16 – 20	2

4. Ages of San Lorenzo High School Teachers

Age	Frequency
21 – 25	5
26 – 30	8
31 – 35	8
36 – 40	11
41 – 45	15
46 – 50	14
51 – 55	12
56 – 60	5
61 – 65	2

5. Pledges to the Victims of Typhoon Mulawin

Pledges in Pesos	Frequency
9,000 – 9,999	4
8,000 – 8,999	12
7,000 – 7,999	13
6,000 – 6,999	15
5,000 – 5,999	19
4,000 – 4,999	30
3,000 – 3,999	21
2,000 – 2,999	41
1,000 – 1,999	31
0 – 999	14

Set B

5. Scores of Periodic Test of IV-Molave Students

Score	Frequency
46 – 50	2
41 – 45	9
36 – 40	13
31 – 35	11
26 – 30	10
21 – 25	5

2. Height of IV-2 Students

Height in cm	Frequency
175 – 179	3
170 – 174	4
165 – 169	10
160 – 164	9
155 – 159	24
150 – 154	11
145 – 169	13
140 – 144	6

3. Midyear Test Scores of Students in Filipino

Class	Frequency
73 – 75	1
70 – 72	6
67 – 69	7
64 – 66	4
61 – 63	7
58 – 60	12
55 – 57	5
52 – 54	5
49 – 51	1
46 – 48	2

4. Ages of Tagkawayan High School Teachers

Class	Frequency
25 – 28	4
29 – 33	14
33 – 36	15
37 – 40	11
41 – 44	12
45 – 48	10
49 – 52	9
53 – 56	3
57 – 60	2

5. Monthly Income of the Families of Fourth Year Students

Income in Pesos	Frequency
9,000 – 9,999	18
8,000 – 8,999	22
7,000 – 7,999	33
6,000 – 6,999	56
5,000 – 5,999	50
4,000 – 4,999	31

Set C

1. Final Grades in Filipino of IV-Kamagong Students

Score	Frequency
89 – 91	2
86 – 88	9
83 – 85	8
80 – 82	13
77 – 79	12
74 – 76	6

2. Weight of First Year Students

Weight in kg	Frequency
93 – 99	1
86 – 92	4
79 – 85	10
72 – 78	14
65 – 71	21
58 – 64	15
51 – 57	14
44 – 50	1

3. Final Grades of IV-Rizal Students in Mathematics

Score	Frequency
93 – 95	1
90 – 92	5
87 – 89	9
84 – 86	16
81 – 83	6
78 – 80	3

4. Ages of IRSO Foods Company Workers

Age	Frequency
27 – 22	8
33 – 28	18
39 – 34	11
45 – 40	16
51 – 46	12
57 – 52	10
63 – 58	2

5. Average Grades of Students of Engineering Block in the First Semester

Average Grade	Frequency
1.01 – 1.50	4
1.51 – 2.00	10
2.01 – 2.50	18
2.51 – 3.00	26
3.01 – 3.50	24
3.51 – 4.00	16
4.01 – 4.50	7
4.51 – 5.00	5

Lesson 4

The Mode of Grouped Data

The mode of grouped data can be approximated using the following formula:

$$\text{Mode} = \text{lb}_{\text{mo}} + \left[\frac{D_1}{D_1 + D_2}\right] i$$

where: lb_{mo} is the lower boundary of the modal class.

D_1 is the difference between the frequencies of the modal class and the next lower class.

D_2 is the difference between the frequencies of the modalclass and the next upper class.

i is the class interval.

The modal class is the class with the highest frequency. If binomial classes exist, any of these classes may be considered as modal class.

Examples:

1. Compute the mode of the scores of the students in a Mathematics IV test.

Class	Frequency
46 – 50	1
41 – 45	5
36 – 40	11
31 – 35	12
26 – 30	11
21 – 25	5
16 – 20	2
11 – 15	1

he frequency distribution for the data is given below. The column for lb is added.

Class	f	lb
46 – 50	1	45.5
41 – 45	5	40.5
36 – 40	11	35.5
31 – 35	**12**	**30.5**
26 – 30	11	25.5
21 – 25	5	20.5
16 – 20	2	15.5
11 – 15	1	10.5

Since class 31 – 35 has the highest frequency, the modal class is 31 – 35.

$lb_{mo} = 30.5$

$D_1 = 12 - 11 = 1$

$D_2 = 12 - 11 = 1$

$i = 5$

$$\text{Mode} = lb_{mo} + \left[\frac{D_1}{D_1 + D_2}\right] i$$

$$\text{Mode} = 30.5 + \left[\frac{1}{1+1}\right](5)$$

Mode = 30.5 + 2.5

Mode = 33

The mode score is 33.

2. Solve for the median gross sale of Aling Mely's Sari-sari Store for one month.

Sales in Pesos	Frequency
1,001 – 1,500	1
1,501 – 2,000	1
2,001 – 2,500	3
2,501 – 3,000	7
3,001 – 3,500	5
3,501 – 4,000	6
4,001 – 4,500	4
4,501 – 5,000	3

The frequency distribution for the data is given below. The column for lb is added.

Sales in Pesos	f	lb
1,001 – 1,500	1	1,000.5
1,501 – 2,000	1	1,500.5
2,001 – 2,500	3	2,000.5
2,501 – 3,000	**7**	**2,500.5**
3,001 – 3,500	5	3,000.5
3,501 – 4,000	6	3,500.5
4,001 – 4,500	4	4,000.5
4,501 – 5,000	3	4,500.5

Since the class 2,501 – 3,000 has the highest frequency, the modal class is 2,501 – 3,000.

$lb_{mo} = 2{,}500.5$

$D_1 = 7 - 3 = 4$

$D_2 = 7 - 5 = 2$

$i = 500$

$$\text{Mode} = lb_{mo} + \left[\frac{D_1}{D_1 + D_2}\right] i$$

$$\text{Mode} = 2{,}500.5 + \left[\frac{4}{4+2}\right](500)$$

Mode = 2,500.5 + 333.33

Mode = 2,833.83

The mode score is 2,833.83.

Try this out

Solve for the mode of each grouped data.

Set A

1. Scores of Diagnostic Test of IV-Narra Students

Score	Frequency
36 – 40	1
31 – 35	10
26 – 20	10
21 – 25	16
16 – 10	9
1 – 5	4

2. Height of IV-2 Students

Height in cm	Frequency
175 – 179	2
170 – 174	5
165 – 169	8
160 – 164	11
155 – 159	21
150 – 154	14
145 – 169	17
140 – 144	2

3. Midyear Test Scores of IV-Newton

Score	Frequency
41 – 45	1
36 – 40	8
31 – 35	8
26 – 30	14
21 – 25	7
16 – 20	2

4. Ages of San Lorenzo High School Teachers

Age	Frequency
21 – 25	5
26 – 30	8
31 – 35	8
36 – 40	11
41 – 45	15
46 – 50	14
51 – 55	12
56 – 60	5
61 – 65	2

5. Pledges to the Victims of Typhoon Mulawin

Pledges in Pesos	Frequency
9,000 – 9,999	4
8,000 – 8,999	12
7,000 – 7,999	13
6,000 – 6,999	15
5,000 – 5,999	19
4,000 – 4,999	30
3,000 – 3,999	21
2,000 – 2,999	41
1,000 – 1,999	31
0 – 999	14

Set B

1. Scores of Periodic Test of IV-Molave Students

Score	Frequency
46 – 50	2
41 – 45	9
36 – 40	13
31 – 35	11
26 – 30	10
21 – 25	5

2. Height of IV-2 Students

Height in cm	Frequency
175 – 179	3
170 – 174	4
165 – 169	10
160 – 164	9
155 – 159	24
150 – 154	11
145 – 169	13
140 – 144	6

3. Midyear Test Scores of Students in English

Class	Frequency
91 – 95	1
86 – 90	6
81 – 85	7
76 – 80	4
71 – 75	7
66 – 70	12
61 – 65	5
56 – 80	5
51 – 55	1
46 – 50	2

4. Ages of Sta. Barbara High School Teachers

Class	Frequency
21 – 25	4
26 – 30	14
31 – 35	15
36 – 40	11
41 – 45	12
46 – 50	10
51 – 55	9
56 – 60	3
61 – 65	1

5. Monthly Income of the Families of Fourth Year Students

Income in Pesos	Frequency
9,000 – 9,999	18
8,000 – 8,999	22
7,000 – 7,999	33
6,000 – 6,999	56
5,000 – 5,999	50
4,000 – 4,999	31

Set C

1. Scores of Achievement Test in Filipino of IV-Kamagong Students

Score	Frequency
86 – 90	2
81 – 85	9
76 – 80	8
71 – 75	13
66 – 60	12
61 – 65	6

2. Weight of First Year Students

Weight in kg	Frequency
75 – 79	1
70 – 74	4
65 – 69	10
60 – 64	14
55 – 59	21
50 – 54	15
45 – 69	14
40 – 44	1

3. Final Test Scores of IV-Rizal

Score	Frequency
91 – 95	1
86 – 90	5
81 – 85	9
76 – 80	16
71 – 75	6
56 – 70	3

4. Ages of Seniro Factory Employees

Age	Frequency
21 – 25	8
26 – 30	18
31 – 35	11
36 – 40	16
41 – 45	12
46 – 50	10
51 – 55	2
56 – 60	2
61 – 65	1

5. Average Grades of Students of Engineering Block in the First Semester

Average Grade	Frequency
1.01 – 1.50	4
1.51 – 2.00	10
2.01 – 2.50	18
2.51 – 3.00	26
3.01 – 3.50	24
3.51 – 4.00	16
4.01 – 4.50	7
4.51 – 5.00	5

Let's summarize

1. When the number of items in a set of data is too big, items are grouped for convenience. The manner of computing for the mean of grouped data is given by the formula:

$$\text{Mean} = \frac{\sum(fX)}{\sum f}$$

where: f is the frequency of each class
X is the class mark of class

2. An alternative formula for computing the mean of grouped data makes use of coded deviation:

$$\text{Mean} = \text{A.M.} + \left[\frac{\sum(fd)}{\sum f}\right] i$$

where: A.M. is the assumed mean

f is the frequency of each class

d is the coded deviation from A.M.

i is the class interval

Any class mark can be considered as assumed mean. But it is convenient to choose the class mark with the highest frequency. The class chosen to contain A.M. is given a 0 deviation. Subsequently, consecutive positive integers are assigned to the classes upward and negative integers to the classes downward.

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3. In computing for the median of grouped data, the following formula is used:

$$\text{Median} = \text{lb}_{\text{mc}} + \left[\frac{\frac{\sum \text{f}}{2} - \text{cf}}{\text{f}_{\text{mc}}} \right] \text{i}$$

where: lb_{mc} is the lower boundary of the median class

f is the frequency of each class

cf is the cumulative frequency of the lower class next to the median class

f_{mc} is the frequency of the median class

i is the class interval

The median class is the class that contains the $\frac{\sum \text{f}}{2}^{\text{th}}$ quantity. The computed median must be within the median class

4. The mode of grouped data can be approximated using the following formula:

$$\text{Mode} = \text{lb}_{\text{mo}} + \left[\frac{\text{D}_1}{\text{D}_1 + \text{D}_2} \right] \text{i}$$

where: lb_{mo} is the lower boundary of the modal class

D_1 is the difference between the frequencies of the modal class and the next upper class

D_2 is the difference between the frequencies of the modal class and the next lower class

i is the class interval

The modal class is the class with the highest frequency. If binomial classes exist, any of these classes may be considered as modal class

What have you learned

Use the frequency distribution table below to answer the questions.

Scores of Students in a Mathematics IV Test

Class	Frequency
46 – 50	1
41 – 45	2
36 – 40	3
31 – 35	10
26 – 30	6
21 – 25	9
16 – 20	5
11 – 15	6
6 – 10	4
1 – 5	2

1. What is the class size?
2. What is the class mark of the class with the highest frequency?
3. What is $\sum fX$?
4. Find the mean score.
5. What is the median class?
6. Determine the cumulative frequency of the median class.
7. Solve for the median score.
8. What is the modal class?
9. Determine the lower boundary of the modal class
10. Compute for the modal score.

Answer Key

How much do you know

1. 50
2. 18
3. 1,085
4. 21.7
5. 16 – 20
6. 25
7. 20.5
8. 16 – 25
9. 15.5
10. 19

Try this out

Lesson 1

Set A
1. 24.6
2. 156.75 cm
3. 30
4. 42.38 years
5. P4,019.50

Set B
1. 34.7
2. 156.88 cm
3. 71.9
4. 39.63 years
5. P6,589.98

Set C
1. 73.8
2. 57.5 kg
3. 79.25
4. 36.75 years
5. 2.97

Lesson 2

Set A
1. 24.6
2. 156.75 cm
3. 30
4. 42.38 years
5. P4,019.50

Set B
1. 34.7
2. 156.88 cm
3. 71.9
4. 39.63 years
5. P6,589.98

Set C
1. 73.8
2. 57.5 kg
3. 79.25
4. 36.75 years
5. 2.97

Lesson 3

Set A
1. 24.25
2. 156.17 cm
3. 29.43
4. 43.17 years
5. P3,666.17

Set B
1. 35.05
2. 156.58 cm
3. 60.5
4. 39.05 years
5. P6,428.07

Set C
1. 81.12
2. 67.83 kg
3. 85.56
4. 34.31 years
5. 3.39

Lesson 4

Set A

1. 23.19
2. 156.56 cm
3. 28.19
4. 44.5 years
5. P2,332.83

Set B

1. 37.17
2. 156.82 cm
3. 68.42
4. 30.5 years
5. P6,206.40

Set C

1. 71.33
2. 56.81 kg
3. 78.44
4. 28.44 years
5. 2.905

What have you learned

1. 47
2. 33
3. 1,159
4. 24.15
5. 21 – 25
6. 26
7. 24.39
8. 31 – 35
9. 30.5
10. 32.32