

Consider these values a sample:

2            1            4            3            5

1. Compute the mean, median, and mode.
2. Compute range, mean deviation, variance, and standard deviation.

$$\text{Mean} = (2+1+4+3+5)/5 = 3 = \bar{x}$$

To compute the median data should be arranged in ascending order first:

1            2            3            4            5

Median is the value in the middle if the number of values odd, median = 3, no mode here.

$$\text{Range} = \text{largest value} - \text{smallest value} = 5 - 1 = 4$$

x	x- mean	Abs(x-mean)
2	-1	1
1	-2	2
4	1	1
3	0	0
5	+2	2
<b>total</b>		<b>6</b>

$$\text{Mean deviation} = (6/5) = 1.2$$

x	x- mean	(x-mean)^2
2	-1	1
1	-2	4
4	1	1
3	0	0
5	+2	4
<b>total</b>		<b>10</b>

$$\text{Variance} = (10/(5-1)) = (10/4) = 2.5$$

$$\text{Standard deviation} = \text{square root of variance} = \sqrt{\text{var iance}} = \sqrt{2.5} = 1.58 .$$

We have the following data:

2            1            4            3            5            4

1. Compute the mean, median, and mode.
2. Compute range, mean deviation, variance, and standard deviation.

$$\text{Mean} = (2+1+4+3+5+4)/5 = 3.173 = \bar{x}$$

To compute the median data should be arranged in ascending order first:

1            2            3            4            4            5

Median is the sum of the two values in the middle divided by 2 if the number of values even,  
 median =  $(3+4)/2 = 3.5$

mode is the most frequent value = 4

$$\text{Range} = \text{max} - \text{min} = 5 - 1 = 4$$

x	x- mean	Abs(x-mean)
2	-1.17	1.17
1	-2.17	2.17
4	0.83	0.83
3	-0.17	0.17
5	+1.83	1.83
4	0.83	0.83
<b>total</b>		<b>7</b>

$$\text{Mean deviation} = \frac{\sum |x - \bar{x}|}{n} = (7/6) = 1.17$$

x	x- mean	(x-mean)^2
2	-1.17	4.7089
1	-2.17	1.3689
4	0.83	0.0289
3	-0.17	0.6889
5	+1.83	0.6889
4	0.83	3.3489
<b>total</b>		<b>10.8334</b>

$$\text{Variance} = \frac{\sum (x - \bar{x})^2}{n - 1} = (10.8334/(6-1)) = (10.8334/5) = 2.17$$

$$\text{Standard deviation} = \text{square root of variance} = \sqrt{\text{variance}} = \sqrt{2.17} = 1.47$$

Consider these values a sample:

15	16	14	13	15	14	22
25	27	29	31	33	35	36
37	38	39	42	45	49	52
55						

**1. Compute the mean and median**

Mean =  $31 = \bar{x}$ , median = 32

**2. Organize the data using stem-and-leaf diagram.**

```
1|3 4 4 5 5 6
2|2 5 7 9
3|1 3 5 6 7 8 9
4|2 5 9
5|2 5
```

The following is stem- and-leaf diagram:

```
1|3 4 4 5 5 6
2|2 5 7 9
3|1 3 5 6 7 8 9
4|2 5 9
5|2 5
```

**1. Compute the mean and median**

Mean =  $31 = \bar{x}$ , median = 32

Consider these values a sample:

15      16      14      13      15      14      22  
 25      27      29      31      33      35      36  
 37      38      39      42      45      49      52  
 55

1. Compute the mean, mode, median

Mean = 31 =  $\bar{x}$ , median = 32

2. Show that  $\sum (x - \bar{x}) = 0$

x	$x - \bar{x}$
15	-16
16	-15
14	-17
13	-18
15	-16
14	-17
22	-9
25	-6
27	-4
29	-2
31	0
33	2
35	4
36	5
37	6
38	7
39	8
42	11
45	14
49	18
52	21
55	24
	$\sum (x - \bar{x}) = 0$

3. Compute the range

Range = (Max - Min) = 55 - 13 = 42

4. Compute the variance and the standard deviation

Variance = 172.76 , Standard deviation = square root of variance =

$$\sqrt{\text{variance}} = \sqrt{172.76} = 13.14$$

- 5. Compute the values corresponding to the first, second, and third quartiles**  
**To compute the required values we need to order the values from the smallest to the largest.**

13	14	14	<b>15</b>	<b>15</b>	16	22
<b>25</b>	27	29	<b>31</b>	<b>33</b>	35	36
37	38	<b>39</b>	<b>42</b>	45	49	52
55						

$L_{25}$  is the location of the first quartile,  $L_{25} = (n + 1) \frac{p}{100} = L_{25} = (22 + 1) \frac{25}{100} = 8$

The value that corresponds to location 8 is 25. The first quartile = 25.

$L_{50}$  is the location of the first quartile,  $L_{50} = (n + 1) \frac{p}{100} = L_{50} = (22 + 1) \frac{50}{100} = 11.5$

The value that corresponding to location 11.5 is between 31 and 33.  $\frac{31 + 33}{2} = 32$ ,

the median = second quartile = 32

$L_{75}$  is the location of the third quartile,  $L_{75} = (n + 1) \frac{p}{100} =$

$L_{75} = (22 + 1) \frac{75}{100} = 17.25$

The value that corresponding to location 17.25 is between 39 and 42. The value that corresponds to location 17 is 39. We add  $0.25(42 - 39)$  to 39:

$39 + 0.25(42 - 39) = 39 + 0.75 = 39.75$ . So the value that corresponding to location 17.25 is 39.75. The third quartile = 39.75.

- 6. Compute the second decile and the 67<sup>th</sup> percentile.**

$L_{20}$  is the location of the second decile,  $L_{20} = (n + 1) \frac{p}{100} = L_{20} = (22 + 1) \frac{20}{100} = 4.6$

The value that corresponding to location 4.6 is between 15 and 15. The value that corresponds to location 4 is 15. We add  $0.6(15 - 15)$  to 15:  $15 + 0.6(15 - 15) = 15$ . So the value that corresponding to location 4.6 is 15. The second decile = 15.

$L_{67}$  is the location of the 67<sup>th</sup> percentile,  $L_{67} = (n + 1) \frac{p}{100} =$

$L_{67} = (22 + 1) \frac{67}{100} = 15.41$

The value that corresponding to location 15.41 is between 37 and 38. The value that corresponds to location 15 is 37. We add  $0.41(38 - 37)$  to 37:  $37 + 0.41(38 - 37) = 37.41$  So the value that corresponding to location 15.41 is 37.41. The 67<sup>th</sup> percentile = 37.41.

Consider the following information a sample:

15      16      14      13      15      14      22  
 25      27      29      31      33      35      36  
 37      38      39      42      45      49      52  
 55

The information to be organized into frequency distribution

**1. How many classes ( $k$ ) would you recommend?**

$k^2 > n$  ,  $2^5 > 32$  ,  $k = 5$  classes I would recommend.

**2. What class interval ( $i$ ) would you suggest (class interval = class width =  $i$ )?**

$i \geq \frac{H - L}{k} = \frac{55 - 13}{5} = 8.4$  ,  $H =$  the largest value,  $L =$  the smallest value.

I can suggest 8.4, 8.5, 9, or 10, I would suggest 10.

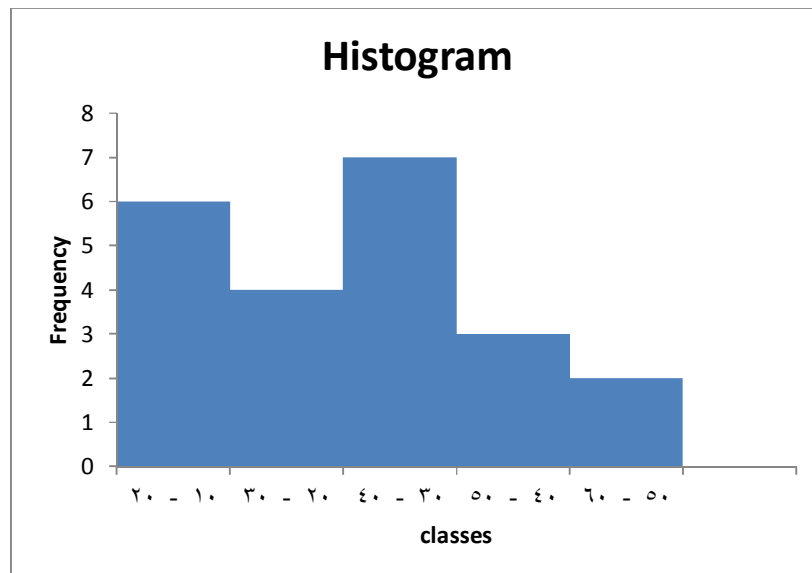
**3. What lower limit you recommend for the first class?**

I recommend 10 so the first class would be (10 – 20).

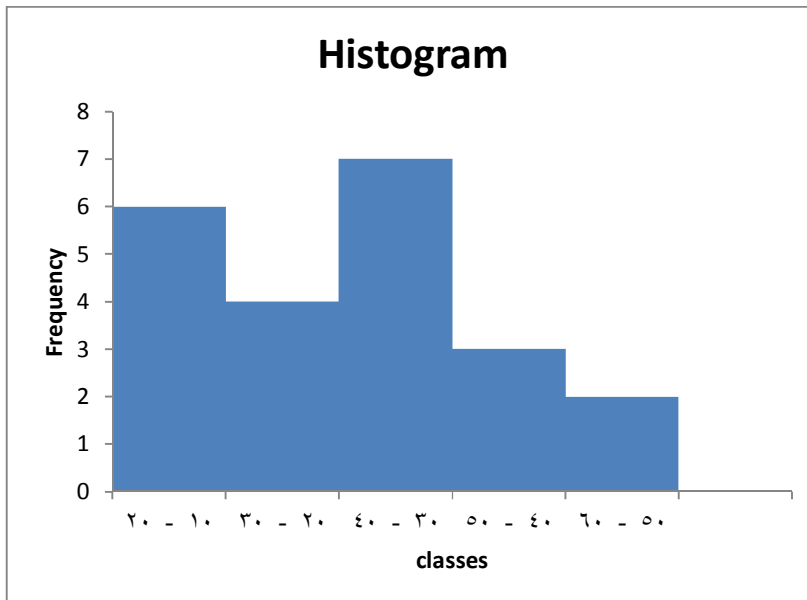
**4. Organize the information into a frequency distribution and determine the frequency distribution, the relative frequency distribution, the cumulative frequency distribution, and the relative cumulative frequency distribution.**

<i>class</i>	<i>Frequency</i>	Relative Frequency	Cumulative Frequency	Cumulative Relative Frequency
10 - 20	6	0.27	6	0.27
20 - 30	4	0.18	10	0.45
30 - 40	7	0.32	17	0.77
40 - 50	3	0.14	20	0.91
50 - 60	2	0.09	22	1.00
<b>Total</b>	<b>22</b>	<b>1</b>		

**5. Draw the histogram**



We have the following histogram:



1. **How many classes?**  
5 classes
2. **What is the class interval (class width)?**  
10.
3. **What is the lower limit for the first class?**  
10
4. **What is the midpoint of the first class?**  
15
5. **What is the frequency of the first class?**  
6
6. **What is the relative frequency of the first class?**  
 $(6/22) = 0.27$