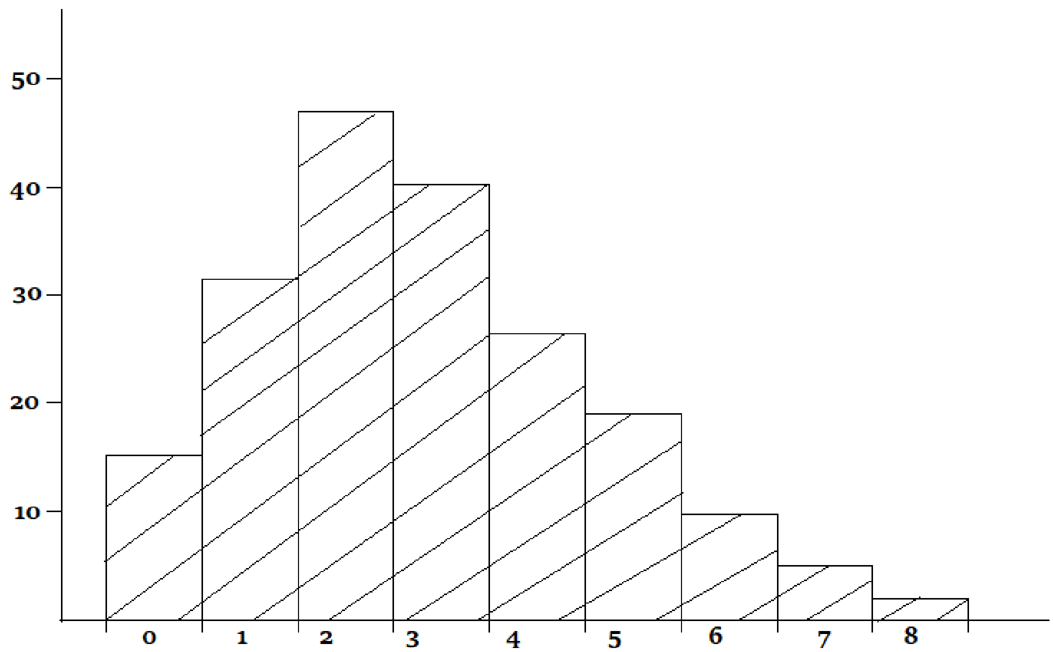
Question One

Large numbers are characterized by errors, deviations, and differences. At the same time, statistics is based on large numbers. Therefore, large numbers make statistics non-intuitive. They make it difficult to trust statistics due to frequent changes and existing differences.

Question Two

a.



b. The histogram has a right tail indicating the data is skewed to the right. It is not symmetrical. Therefore, central tendency cannot be easily determined using the chart.

Question Three

X	**$(x - \bar{x})$**	**$(x - \bar{x})^2$**
25	7.1111	50.56774
18	0.1111	0.012343
23	5.1111	26.12334
16	-1.8889	3.567943
16	-1.8889	3.567943

14	-3.8889	15.12354
22	4.1111	16.90114
17	-0.8889	0.790143
10	-7.8889	62.23474
161		**178.8889**

a. Mean

$\Sigma x_i / n$

$= 161/9$

= 17.8889

b. Variance

$= \Sigma (x_i - \bar{x})^2 / n - 1$

$= 178.8889 / 8$

= 22.3611

c. Standard deviation

$\sqrt{22.3611}$

= 4.7288

Question Four

X	$(x - \bar{x})$	$(x - \bar{x})^2$
10.3	0.4600	0.2116
11.1	1.2600	1.5876
9.6	-0.2400	0.0576
9.0	-0.8400	0.7056
14.5	4.6600	21.7156
13.0	3.1600	9.9856
6.7	-3.1400	9.8596
11.0	1.1600	1.3456
8.4	-1.4400	2.0736
10.3	0.4600	0.2116
8.0	-1.8400	3.3856
11.2	1.3600	1.8496

7.3	-2.5400	6.4516
5.3	-4.5400	20.6116
12.5	2.6600	7.0756
8.0	-1.8400	3.3856
11.8	1.9600	3.8416
8.7	-1.1400	1.2996
10.6	0.7600	0.5776
9.5	-0.3400	0.1156
Σ = 196.8		**Σ = 96.348**

a. Mean

$\Sigma x_i / n$

= 196.8/20

= **9.84**

b. Variance

$= \Sigma (x_i - \bar{x})^2 / n - 1$

= 96.348/19

=5.0709

c. Standard deviation

$\sqrt{5.0709}$

= 2.2519

d. Histogram

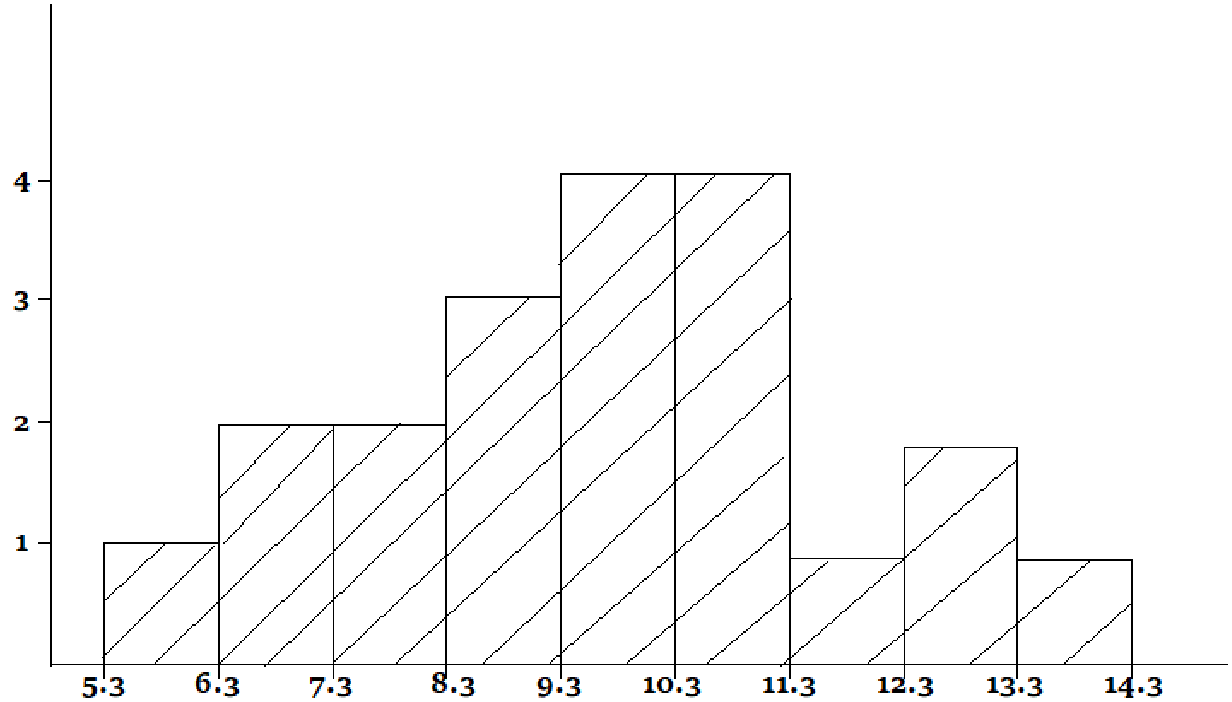
i. Order

ii. Range: 5.3 – 14.5

iii. Width: 14.5 – 5.3 = 9.2

iv. Boxes: 9

v. Size of boxes: 9.2/9 = 1.0



Question Five

x	y	(x – x̄)	(y-ȳ)	(x – x̄)^2	(y-ȳ)^2	(y-y) (x – x̄)
3	-1.5	2	-4.54	4	20.6116	-9.08
2	1.2	1	-1.84	1	3.3856	-1.84
1	3.1	0	0.06	0	0.0036	0
-1	7.4	-2	4.36	4	19.0096	-8.72
0	5.0	-1	1.96	1	3.8416	-1.96
Σ = 5	**Σ = 15.2**	**Σ = 0**	**Σ = 0**	**Σ =10**	**Σ = 46.852**	**Σ = - 21.6**

a. Mean

$\Sigma\, x_i / n$

5/5 = **1**

$\Sigma\, y_i / n$

15.2/5 = **3.04**

a. Fill in the chart

b. Standard deviation

Variance x = 10/4 = 2.5

SD x = $\sqrt{2.5}$ **= 1.5811**

Variance y = 46.852/4 = 11.713

SD y = $\sqrt{11.713}$ **= 3.4224**

c. Covariance

Cov (X, Y) = [Σ (y-y) (x – x̄)] / n-1

= -21.6/4

= -5.4 (x and y tend to move in opposite directions)

d. Correlation

= Cov (X, Y) / S_x S_y

= -5.4 / (1.5811 * 3.4224)

= - 0.9979

Therefore, x and y are negatively correlated. Correlation coefficient shows that x and y have a strong negative linear relationship. Basically, as x increases y decreases.