

BIRZEIT UNIVERSITY
MATHEMATICS DEPARTMENT
Stat 236
Summer semester 2014/2015- First Exam

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$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

Z - Score: $z = \frac{x - \mu}{\sigma}$

Correlation coefficient: $r = \frac{s_{xy}}{s_x s_y} = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n\sum x^2 - (\sum x)^2} \sqrt{n\sum y^2 - (\sum y)^2}}$

Covariance: $s_{xy} = \frac{\sum (x - \bar{x})(y - \bar{y})}{n-1}$

Question # 1: (12 points) Circle the correct answer.

1. In purchasing an automobile, there are a number of variables to consider. The color of the car is an example of what type of variables.
 - a. Qualitative data
 - b. Discrete Quantitative data
 - c. Continuous Quantitative data
2. The number of gallons of gasoline pumped by a filling station during a day is an example of :
 - a. Ordinal
 - b. Nominal
 - c. Interval
 - d. Ratio
3. In a Positively skewed distribution, one of the following is true.
 - a. The median equals the mean
 - b. The median is less than the mean.
 - c. The median is larger than the mean.
 - d. There is no relation between the median and the mean.

Science college surveys 50 randomly selected days and found that the average temperature of those days is 25. Answer questions (4-7):

4. The number of elements:
 - a. 1
 - b. 25
 - c. 50
 - d. None.
5. Determine whether the given value (25) is a statistic or a parameter
 - a. Statistic.
 - b. Parameter.

70

Year

6. Determine the scale of measurements:
 a. Ordinal b. Nominal **c. Interval** d. Ratio

7. The data collected are:
a. Cross sectional data. **b.** Time series data.

8. During the past six months, the purchasing agent bought:
1200 tons of coal at \$28 a ton
3000 tons of coal at \$87 a ton
500 tons of coal at \$88 a ton

What is the mean price per ton?

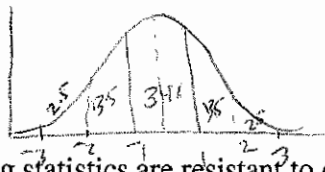
- a. \$87.25
 b. \$68.47
 c. \$89.18
d. \$72.04

9. A study indicates that the weights of 1200 adults are a symmetric distributed with mean of 140 lbs and standard deviation of 25 lbs. $\sigma = 25$
 Approximately how many of them will weigh more than 165 lbs $\frac{x - \mu}{\sigma}$

- a.** 1
 b. 16
c. 192
 d. 816

10. According to the Chebyshev's rule, at least 55.5% of all observations in any data set are contained within a distance of how many standard deviations around the mean?

- a. 2
 b. 2.5
c. 1.5
 d. 3



$$1 - \frac{1}{z^2} = 55.5\%$$

$$-\frac{1}{z^2} = x - 0.445$$

$$-1 = z^2 \cdot -0.445$$

$$z^2 = \frac{1}{0.445} \approx 1.49$$

11. Which of the following statistics are resistant to outliers?

- I. The median
 II. The interquartile range
 III. The standard deviation

- a.** I and II only
 b. I and III only
 c. II and III only
 d. I, II, and III
 e. None of the above.

12. A correlation of $r = -0.95$ indicates that the scatter diagram of the data would show:

- a. Points tightly packed around a line that slopes up to the right.
 b. Points tightly packed around a line that slopes down to the right.
 c. Points widely scattered around a line that slopes up to the right.
d. Points widely scattered around a line that slopes down to the left.

Question # 2 (12 points)

Using the data set: 7, 9, 10, 13, 13, 14 which represents a sample of data

- Provide a **five-number summary** for the data
- Do the data contain any **outliers**? Support your answer.
- Find the coefficient of variation.

A) Smallest value = 7
 $Q_1 = \frac{25}{100} \times 6 = 1.5$
 $Q_2 = \frac{50}{100} \times 6 = 3$
 $Q_3 = \frac{75}{100} \times 6 = 4.5$
 largest value = 14
 outliers = 14

Upper limit = 9
 lower limit = -3

B) 7, 9, 10, 13, 13, 14

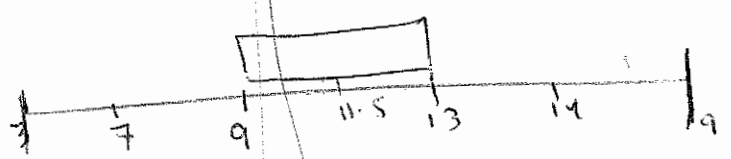
Smallest value = 7
 largest value = 14

$Q_1 = \frac{25}{100} \times 6 = 1.5$

$Q_2 = \frac{50}{100} \times 6 = 3$

$Q_3 = \frac{75}{100} \times 6 = 4.5$

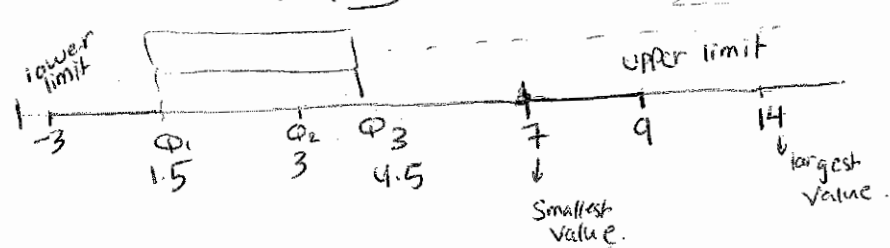
Outlier لأن أكبر من الحد الأعلى
 لا يوجد لأن أصغر من الحد الأدنى



Upper limit = $Q_3 + 1.5 IQR = 4.5 + 1.5(3) = 9$

$IQR = Q_3 - Q_1 = 4.5 - 1.5 = 3$

Lower limit = $Q_1 - 1.5 IQR = 1.5 - 1.5(3) = -3$



Yes, there is outlier

Because 14 is larger than the upper limit.

←

Question # 3 (12 points)

of students.

The following data show the number of hours worked by 100 BZU students.

answer the following questions.

Class	Frequency f	Mid. Point	f.m
0-6	20	3	60
7-13	25	10	250
14-20	30	17	510
21-27	15	24	360
28-34	10	31	310
Total	100	85	1490

a. Find the mean the of the data.

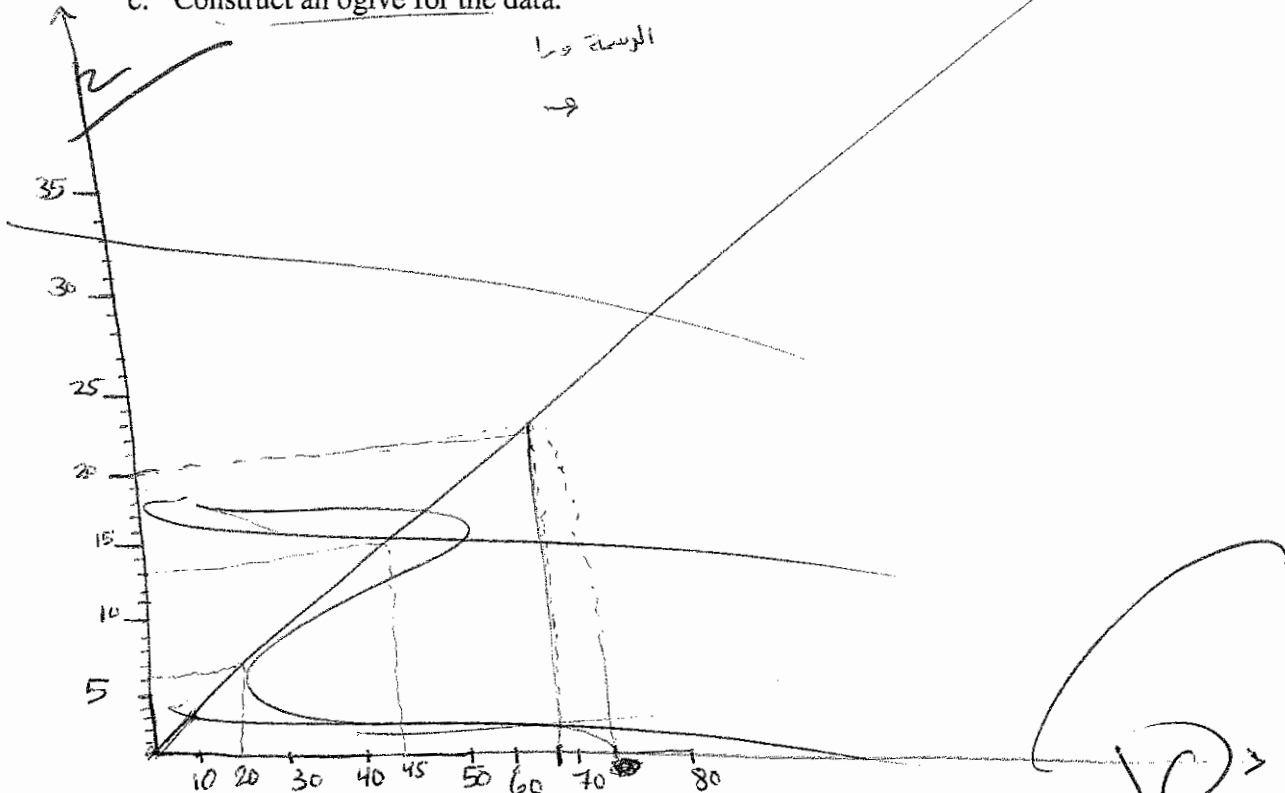
$$\text{Mean} = \frac{\sum f.m}{f} = \frac{1490}{100} = 14.9$$

b. Construct a cumulative frequency table?

less than
or equal
6

# of classes	Cumulative frequency
0-6	20
less than or equal 13	45
less than or equal 20	75
less than or equal 27	90
less than or equal 34	100

c. Construct an ogive for the data.



Question # 3 (4 points)

The Birth weights for a random sample babies is given by:

3.71, 3.53, 3.82, 3.84, 3.85, 3.79, 3.8, 3.54, 3.52, 3.84, 3.54

Construct a stem - and- leaf- diagram and find the mode of the data?

Arrange Data

↳ 3.52, 3.52, 3.54, 3.54, 3.71, 3.79,
3.8, 3.82, 3.84, 3.84, 3.85

Stem	leaf
35	2 3 4 4
37	1 9
38	0 2 4 4 5

Key: 35/2 → mean 3.52

and leaf unit = 0.01

Mode = The most repeated data

↳ There is no mode because

3.54 and 3.84

repeated two times

So there is no data repeated

more than the others.