



# BIRZEIT UNIVERSITY

MATHEMATICS DEPARTMENT

Stat 236

Time: 1 HOUR

Spring 2014

First Exam

Name (بالعربية).....Number.....

Instructor .....Sec. 1.....

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

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

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

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

$$\text{Permutations: } {}_n P_r = \frac{n!}{(n-r)!}$$

$$\text{Combinations: } {}_n C_r = \frac{n!}{(n-r)! r!}$$

$$\text{Conditional probability: } p(A \setminus B) = \frac{p(A \cap B)}{p(B)}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

### Instructions:

1. Clearly write your name, student number, and instructor name in the space above.
2. There are 3 questions in 5 pages numbered from 1 to 5.
3. Please work each problem in the space provided.
4. Write neatly and legibly. Cross out any work that you do not wish to be considered for grading.
5. You can use your own calculator only.
6. Please be sure to turn your cell phone off.

Q #1(13 points): Circle the correct answer

1. IQ scores have bell shaped distribution with a mean of 100 and a standard deviation of

15. Find the percentage of those who will have an IQ score of 85 or more.  $Z = \frac{85 - 100}{15} = -1$

- a) 84%  
 b) 95%  
 c) 81.5%  
 d) 16%

2. What is the sample mean for the data set: 1, 2, 5, 3, 6

- a) 2  
 b) 2.5  
 c) 2.8  
 d) 3.4  
 e) None of the above

3. If the coefficient of variation is 40% and the mean is 70, then the standard deviation is

- a) 28  
 b) 2800  
 c) 1.75  
 d) 784

$$COV = 40\% = \frac{st.d}{mean} \times 100$$
$$40 = \frac{st.d}{70} \times 100$$

4. The estimation of all BZU students' cumulative average based on the sample cumulative average of 500 randomly selected students is an example of inferential statistics.

- a) True  
 b) False

5. In a post office, the mailboxes are numbered from 1 to 5000. These numbers represent a

- a) quantitative data variable  
 b) qualitative data variable

6. Which of the following is NOT sensitive to extreme values?

- a) the range  
 b) the standard deviation  
 c) the interquartile range  
 d) the coefficient of variation

7. The classification of student major (accounting, economics, management, marketing, other) is an example of

- a) Nominal  
 b) Ordinal  
 c) Interval  
 d) Ratio

8. When extreme values are present in a set of data, which of the following descriptive summary measures are most appropriate?

- a) interquartile range and median  
 b) variance and interquartile range  
 c) arithmetic mean and standard deviation

9. You were told that the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles of female students' weight at a major university are 95 lbs, 125 lbs, and 138 lbs. What percentages of the students weigh between 95 and 138 lbs?

- a) 75%  
 b) 50%  
 c) 25%  
 d) Cannot be determined from the given information

~~8/10 + 7/10~~  
 $\frac{8}{10}$        $\frac{8 \times 3}{10}$       2.4  
 8 + 9

10. A student gets quiz grades of 80, 70, and 90. She gets a 75 on her final exam. Find the weighted mean if the quizzes each count for 10% and the final exam counts for 70% of the final grade.

a) 76.5  
 b) 73  
 c) 75  
 d) None of the above

$\frac{8}{10} + 8$       ~ 52.5  


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 $\frac{8}{10} + \frac{52.5}{70}$       80

11. Five applications for admission to a local university are checked, and it is determined whether each applicant is male or female. Find the number of sample points in this experiment

a) 8  
 b) 16  
 c) 32  
 d) None of the above

$P(M \cup F) = P(M) + P(F)$        $5 \times 2$   
 $\frac{1}{2} + \frac{1}{2}$

12. If event A and event B cannot occur at the same time, then events A and B are said to be Independent events.

- a) True       b) False

13. A die is rolled 4 times. Find the probability of observing four ones in a row.

a)  $\frac{1}{6}$   
 b)  $\frac{1}{216}$   
 c)  $\frac{1}{1296}$   
 d)  $\frac{1295}{1296}$   
 e) None of the above

$\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6}$

2

Q #2(6 points): The stem-and-leaf display a data is shown below.

Stem	Leaves
0	246
1	26822
2	0212408
3	119
4	5

3, 4, 6, 12,

14. What is the mode of the data?

21

15. What is the range of the data?

$45 - 3 = 42$

$z = \frac{x - \mu}{\text{std}}$

16. What percentage of the data values 10 through 27?

$\left(1 - \frac{1}{(27)^2}\right) = 99.8\% \quad \left(1 - \frac{1}{(10)^2}\right) = 99\%$

17. Find the limits of the box-plot for ce.

upper limit =  $Q_3 + 1.5(Q_3 - Q_1)$

$Q_3 = \frac{275}{100} \times 20 = 15$

$Q_1 = \frac{25}{100} \times 20 = 5$

upper =  $27 + 1.5(10) = 42$

lower =  $17 - 15 = 2$

lower limit =  $Q_1 - 1.5(IQ)$

$\frac{26 + 28}{2} = 27$

$\frac{16 + 18}{2} = 17$

18. Is there any outliers? Support your answer

yes

outliers is 42 more than the ~~limit~~ upper limit.

5.5

~~3, 4, 6, 12, 18, 19, 19, 20, 21, 21, 21, 27, 29, 26, 28, 31, 31~~ are less than the

lower limit.

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Q #3(6 points): The following table shows the responses of ten students to questions about their gender and their drinks preferences

Gender (Male = 1, Female = 2),

Preferred type of drink (1 = coffee, 2 = tea, 3 = juice),

Student Id	1	2	3	4	5	6	7	8	9	10
Gender	1	2	1	1	2	1	2	2	1	1
Preferences	1	3	2	1	3	2	2	1	3	1

19. Name the variables and indicate whether they are qualitative or quantitative. What measurement scale (level) is used for each variable.

qualitative = Student Id / gender / preferences  
 nominal / nominal / nominal

20. Construct a crosstabulation for the variables (gender) and preferences.

gender \	coffee	tea	juice	total
male	3	2	1	6
female	1	1	2	4
total	4	3	3	10

If a student is selected at random;

21. What is the probability that the student preferred tea  $\frac{3}{10}$

22. What is the probability that the student preferred coffee given that he is male?  $P(C/M)$

$$\frac{3}{6}$$

$$\frac{C/M}{4}$$

$$P = \frac{3}{6} = \frac{1}{2}$$

23. What is the probability that the student preferred coffee or she is female?  $P(C \cup F)$

$$P(C \cup F) = P(C) + P(F) - P(C \cap F)$$

$$= \frac{4}{10} + \frac{4}{10} - \frac{1}{10} = \frac{7}{10}$$

24. Are the variables gender and preferences independent? Support your answer.

no, it is ~~not~~ dependent Bez.

$$P(C/M) \neq P(C)$$

$$\frac{1}{2} \neq \frac{4}{10}$$