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AMERICAN UNIVERSITY OF BEIRUT

MATH 207, quiz I

Time= 1 hour

Instructions: You are allowed to bring with you the following: One formula sheet and a calculator

PART I: MULTIPLE CHOICE

1. In a study of the effects of acid rain, a random sample of 100 trees from a particular forest are examined. Forty percent of these show some signs of damage. Which of the following statements are correct?
 - (a) 40% is a parameter
 - (b) 40% is a statistic
 - (c) 40% of all trees in the forest show signs of damage
 - (d) more than 40% of the trees in the forest show signs of damage
 - (e) less than 40% of the trees in the forest show signs of damage

2. A student organization wants to assess the attitudes of students towards a proposed change in the hours that the library is open. They randomly select 50 freshmen, 50 sophomores, 50 juniors, and 50 seniors. The situation described is
 - (a) a stratified random sample
 - (b) a simple random sample
 - (c) a systematic random sample
 - (d) a comparative study
 - (e) none of the above

3. A new headache remedy is given to a group of 25 patients who suffer severe headache. Of these, 20 report that the remedy is very helpful in treating their headaches.
From this information you conclude:
 - (a) the remedy is effective for the treatment of headaches

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- (b) nothing, because the sample size is small
- (c) nothing, because there is no control group
- (d) the new treatment is better than aspirin
- (e) none of the above

4. The grade point average (GPA) of 7 randomly chosen students from a calculus class are:

3.14 2.37 2.94 3.60 1.70 4.00 1.85

If $\sum(x_i - \bar{x})^2 = 4.51$, then the standard deviation (round off to two place after the decimal) is

- (a) 0.75
 - (b) 0.87
 - (c) 0.64
 - (d) 0.80
 - (e) none of the above
5. You record the age, marital status, and earned income of a sample of 1463 women. The number of variables you have recorded is
- (a) 1463
 - (b) four- age, marital status, income, and number of women
 - (c) three- age, marital status, and income
 - (d) two- age, and income. Marital status is not a variable because it doesn't have a unit like dollars or years.
 - (e) none of the above
6. A study found $R^2 = 0.36$ between the sex of a worker and his or her income. You conclude that
- (a) Women earn more than men on the average
 - (b) Women earn less than men on the average

- (c) an arithmetic mistake was made; this is not a possible value for R^2
- (d) This is non-sense because regression doesn't make sense here
- (e) none of the above

PART II: Written Questions Please show your work!

7. Here are the survival times (in days) of lab rats infected with a deadly virus in a test of resistance to infection
 5.19 6.27 4.47 12.86 2.20 4.00 3.62 7.15 3.13 9.97 6.25 4.71 7.53 5.76
 1.43 5.94 2.65 4.52 8.45 3.45
 (A) Give the Five-Number summary for these data. Are there any potential outliers?
8. Here are month-by-month data for production of cottage cheese X and ice cream Y for a recent year.

X	70.9	72.4	81.6	79.8	85.2	77.6	80.7	75.5	73.9	77.67	69.8	69.3
Y	54.9	54.1	61.6	64.3	68.5	75.7	80.1	77.0	69.4	63.1	49.9	54.1

A Scatter plot (don't do it) shows a somewhat a linear pattern. Computer output contains the following information:

Variable	Mean	Standard deviation
X	76.1917	5.08267
Y	64.3917	9.98621

$R^2 = 0.36890$

- (a) Use the above information to compute the least squares regression line of Y on X i.e. b_0 and b_1 .
- (b) Explain what R^2 means here!