



SAN DIEGO STATE
UNIVERSITY

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MEMORANDUM

TO: Incoming SDSU SPH Students

FROM: Biostatistics Faculty

DATE: Spring, 2020

SUBJECT: Preparation for PH 602 - Biostatistics Core Course

The practice of public health depends heavily on an understanding of the population and its characteristics. The foundation for this understanding is based on your skills in biostatistics and mathematics.

It is **highly recommended** (although not required – repeat: **not required**) that all students have adequate preparation in statistics prior to enrollment in PH 602 Biostatistics, which is a required core course for all MPH students. It is in your best interests to prepare yourself for the quantitative material in PH 602. To help you gauge your current level of introductory statistics, a sample exam is attached. We strongly suggest you take the exam to determine your readiness for graduate-level biostatistics, and you should take appropriate action if you do not achieve a satisfactory score.

If you find that you have not achieved a satisfactory score on the sample exam (or if you wish to refresh your knowledge of the subject), it is strongly recommended that you prepare for PH 602 by studying Chapters 1, 2, and 3 of High-Yield Biostatistics by Anthony N. Glaser.

Alternatively, a statistics course may be taken at a community college in preparation for the school year. Acceptable courses at community colleges in the San Diego area are: Math 119 at Mesa, Miramar, or City College; Math 160 or Biology 215 at Grossmont College; or Math 120 at Palomar College.

Any questions regarding satisfactory quantitative preparation for PH 602 should be directed to Dr. John Alcaraz at jalcaraz@sdsu.edu.

Sample PH 602 Competency Test

School of Public Health

Counting parts of questions as separate questions, there are 24 questions on this test.

To pass the exam, you must get at least 17 of them correct.

YOU HAVE A MAXIMUM OF 25 MINUTES TO COMPLETE THIS TEST

1. $(-10)^3 = ?$
2. If $\frac{x-u}{c} = 1.4$, $u = 10$ and $c = 2$, then $x = ?$
3. If a sample has values 4, 6, 8, 30, then the sample mean is _____.
4. Suppose that on the basis of past experience it is known that a woman with breast cancer has a chance of 80 in 100 of surviving five years. If two women with breast cancer are chosen at random, what is the chance that both will not survive five years?
A. .04 B. .36 C. .20 D. .40 E. .64
5. The ten letters of the word "STATISTICS" are written on like slips of paper. These slips are placed in a box and thoroughly mixed. One slip is drawn.
 - i. What is the probability that the slip has a "T" on it?
 - ii. What is the probability that the slip does not have an "S" or a "T" on it?A. 1/10 B. 3/10 C. 4/10 D. 1/2 E. 3/5
6. Let A and B denote two genetic characteristics and suppose that the probability is $\frac{1}{2}$ that an individual chosen at random will exhibit A, $\frac{3}{4}$ that he will exhibit B. Assume that these characteristics occur independently. What is the probability that an individual chosen at random will exhibit both characteristics?
A. 1/4 B. 3/8 C. 1/8 D. 0 E. 1
7. In a study of 1500 head injury patients examined radiographically, 93 were found to have sustained a skull fracture of whom 21 had eardrum discoloration. Of the entire group of 1500 patients, 89 had eardrum discoloration.
 - i. What is the probability of eardrum discoloration in a patient with a fracture?
A. 21/89 B. 21/93 C. 89/1500 D. 21/1500 E. 93/1500
 - ii. What is the conditional probability of a fracture given eardrum discoloration is present?
A. 21/89 B. 21/93 C. 89/1500 D. 21/1500 E. 93/1500

8. Mary and John are both members of a class consisting of 30 men and 20 women. If a random sample of 5 students are chosen from the class, which of the following statements is true?
- A. Mary is more likely to be chosen than is John.
 - B. Mary is less likely to be chosen than is John.
 - C. Mary and John are equally likely to be chosen.
 - D. Mary's chances of being chosen are different than those of John.
 - E. Both Mary and John will not be chosen.
9. A random sample is always typical of the population from which it is taken.
- A. True
 - B. False
10. Random selection of sample members means that every member in the population has an equal and independent chance of being selected.
- A. True
 - B. False
11. Answer the following two questions without computation.

Given the sample:

3.694 5.872 0.346 98.78 7.698

- i. The median will be
- A. below 3.694
 - B. between 3.694 and 5.872
 - C. between 5.872 and 7.698
 - D. 5.872
 - E. 0.346
- ii. The median will be
- A. smaller than the mean.
 - B. equal to the mean.
 - C. greater than the mean.
12. Which measure of central tendency, the mean, the median, or the mode, will be most affected by extremely large or small observations?
- A. mean
 - B. median
 - C. mode
13. If the variance of a set of 16 data points is 36.0:
- i. The standard deviation is
- A. 36/16
 - B. 52
 - C. 4
 - D. 6
 - E. 9

ii. The standard error of the mean is

- A. $36/16$ B. $6/4$ C. $6/16$ D. $36/4$

14. Which of the following are all measures of variability?

- A. range, standard deviation and mode
B. mean, variance and mode
C. range, standard error and variance
D. mean, mode and median
E. median, standard deviation and interquartile range

15. Sample X and Sample Y are drawn from the same population. Sample X consists of 25 observations and Sample Y of 36 observations. The standard error of the sample mean from Sample X will probably be:

- A. smaller than the standard error in Sample Y.
B. the same as the standard error in Sample Y.
C. larger than the standard error in Sample Y.

16. If $X_1 = 3$, $X_2 = 4$, $X_3 = 0$, $X_4 = 2$, evaluate:

a) 4

$$\sum_{i=1} X_i + 3$$

b) 4

$$\sum_{i=1} (X_i - 4)^2$$

17. A two-sided (two-tailed) test means that the null hypothesis could be rejected if values of the test statistic are too extreme in either of the two directions.

- A. True B. False

18. The null hypothesis should always be stated in terms of:

- A. The test statistic
B. The sample statistic(s) such as a sample mean
C. The population parameter(s) such as a population mean

19. The level of significance is the probability of:

- A. Rejecting the null hypothesis when, in fact, the null hypothesis is true
B. Accepting the null hypothesis when, in fact, the null hypothesis is true
C. Rejecting the alternative hypothesis when, in fact, the null hypothesis is true

Sample PH 602 Competency Exam Solutions

- 1) -1000
- 2) 12.8
- 3) 12
- 4) A
- 5i) B
- 5ii) C
- 6) B
- 7i) B
- 7ii) A
- 8) C
- 9) B
- 10) A
- 11i) D
- 11ii) A
- 12) A
- 13i) D
- 13ii) B
- 14) C
- 15) C
- 16a) 12
- 16b) 21
- 17) A
- 18) C
- 19) A