Exam 1 Instructions

- Remove this sheet of instructions from your exam. You may use the back of this sheet for scratch work.
- This is a "closed book, closed notes" exam. You are not allowed to use any materials other than the exam instruction sheet, the exam 1 formula sheet, and a calculator.
- The exam consists of 25 questions. Make sure that you have a complete exam.
- Indicate your **name, new student ID, and test version** at the top of your scantron form. You must use NCS Pearson form 30423.
- On the **Die Rolling** experiment, **read carefully**. Not all dice have 6 sides.
- Students are **not** allowed to pass calculators back and forth.
- There are **multiple versions** of the exam. It will not help to copy from the person next to you.
- Each correct answer is worth 4 points. If you omit the answer to a question you will receive no points (zero points) for that question. Each incorrect answer is worth –1 point (one point will be deducted).

$$n! = n*(n-1)*\ldots*2*1$$

$$\binom{n}{m} = \frac{n!}{m!(n-m)!}$$

$$rel.freq. = \frac{freq.}{n}$$

$$\bar{x} = \frac{\Sigma x}{n}$$

$$\mu = \frac{\Sigma x}{N}$$

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

$$\sigma = \sqrt{\frac{\Sigma(x-\mu)^2}{N}}$$

$$s^2 = \frac{\Sigma(x-x)^2}{n-1} = \frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n-1}$$

$$\sigma^2 = \frac{\Sigma(x-\mu)^2}{N}$$

$$\frac{1}{2}(n+1)$$

$$skew = \frac{3(\bar{x}-\tilde{x})}{s}$$

$$\mathrm{IQR} = \mathrm{Q}_3 - \mathrm{Q}_1$$

$$z = \frac{x-\mu}{\sigma}$$

$$SS(x) = \Sigma x^2 - \frac{(\Sigma x)^2}{n} = \Sigma(x-\bar{x})^2$$

$$SS(y) = \Sigma y^2 - \frac{(\Sigma y)^2}{n} = \Sigma(y-\bar{y})^2$$

$$SS(xy) = \Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n} = \Sigma(x-\bar{x})(y-\bar{y})$$

$$r = \frac{SS(xy)}{\sqrt{SS(x)*SS(y)}}$$

$$r = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n}}{\sqrt{\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]*\left[\Sigma y^2 - \frac{(\Sigma y)^2}{n}\right]}}$$

$$r = \left(\frac{1}{n-1}\right)\Sigma\left(\frac{x-\bar{x}}{s_x}\right)\left(\frac{y-\bar{y}}{s_y}\right)$$

$$r = \left(\frac{1}{n-1}\right)\left(\frac{1}{s_x * s_y}\right)\Sigma(x-\bar{x})(y-\bar{y})$$

$$y = b_0 + b_1 x$$

$$b_1 = \frac{SS(xy)}{SS(x)}$$

$$b_1 = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n}}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}$$

$$b_1 = r\left(\frac{s_y}{s_x}\right)$$

$$b_0 = \bar{y} - b_1\bar{x}$$

$$residual = y - \hat{y}$$

$$SSE = \Sigma(y-\hat{y})^2$$

$$P(A) = \frac{r}{m}$$
$$\hat{P}(A) = \frac{k}{n}$$

$$P(notA) = 1 - P(A)$$
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cup B) = P(A) + P(B)$$

$$P(A \cap B) = P(A) * P(B \mid A)$$

$$P(A \cap B) = P(B) * P(A \mid B)$$

$$P(A \cap B) = P(A) * P(B)$$

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$

$$P(B \mid A) = \frac{P(A \cap B)}{P(A)}$$

$$P(A) = P(A \mid B)$$
and
$$P(B) = P(B \mid A)$$

Stat211 Practice Exam 1

1. "How many spelling errors occur on a page of typewritten text" is a
    a. ranked categorical variable
    b. unranked categorical variable
    c. discrete numeric variable
    d. continuous numeric variable
    e. none of the above

2. The "weight of the textbook" in a student's easiest course is a
    a. ranked categorical variable
    b. continuous categorical variable
    c. discrete numeric variable
    d. continuous numeric variable
    e. none of the above

3. A student's "anticipated profession" is a
    a. ranked categorical variable
    b. unranked categorical variable
    c. discrete numeric variable
    d. categorical numeric variable
    e. none of the above

4. Suppose that the Student Statistics club has 10 members. Three members will be selected to participate in the National Statistics Conference. How many distinct groups of three students may be selected?
    a. 120
    b. 3628800
    c. 6
    d. 30
    e. none of the above

5. Two expressions are "algebraically equivalent" if
    a. they have the same number of terms
    b. they have the same value for the exponent(s)
    c. they can be used "interchangeably" in statistical calculations
    d. parts a) and c) only
    e. none of the above

6. A frequency histogram
    a. requires a frequency distribution to construct the histogram
    b. cannot have bars of unequal width
    c. cannot have bars of unequal height
    d. can be used to depict the distribution of the values of a categorical variable
    e. none of the above

7. A pie chart can be used to represent
   a. the distribution of the values of a categorical variable
   b. the distribution of the values of a numeric variable
   c. proportions or percents associated with each value of a categorical variable
   d. parts a) and c) only
   e. none of the above

8. A histogram can be used to represent the distribution of values of a
   a. ranked categorical variable
   b. unranked categorical variable
   c. ranked numeric variable
   d. continuous numeric variable
   e. none of the above

9. The sample median for the following data
   156 334 779 506 284 622
   is
   a. 642.5
   b. 3.5
   c. 389
   d. 420
   e. none of the above

10. The sample mean for the following data
    13 15 56 89 62 43
    is
    a. 278
    b. 72.5
    c. 44.5
    d. 46.3…
    e. none of the above

11. Suppose the value of the sample standard deviation is zero for a set of data. Then we
    a. should recalculate the value of the sample standard deviation, because it can never be equal to 0
    b. can say that all the data values are 0
    c. can infer that all the data values are the same, but not necessarily zero
    d. cannot infer anything about the values of the data
    e. none of the above

12. The value of the sample standard deviation for the following sample data
    58 47 35 54 16
    is
    a. 16.956
    b. 287.5
    c. 230

d. 15.17
e. none of the above

13. For the following data
45 10 56 34 23 85 42 55
the sample mode has the value
a. 43.75
b. 0
c. 43.5
d. 28.5
e. none of the above

14. Two numeric variables X and Y exhibit a positive correlation if
a. the values of X and Y always have the same difference
b. the value of Y tends to decrease as the value of X decreases
c. the value of X tends to decrease as the value of X increases
d. parts a) and b) only
e. none of the above

15. The value of b_0 in a regression equation
a. can never be negative
b. is always between –1 and +1, inclusive
c. is always between 0 and 1 inclusive
d. provides information about the skewness of the data
e. none of the above

16. Suppose that you calculate the sample Pearson correlation coefficient between X = weekly total amount of time exercising, and Y = resting heartbeat rate per minute. A value of r = -1.18 would be interpreted as
a. a strong negative correlation between exercise and heart rate
b. a perfect negative correlation between exercise and heart rate
c. little or no correlation between exercise and heart rate
d. an impossible value for r
e. none of the above

17. Consider the variables X= daily high temperature, and Y= number of people using the city library. You compute the sample Pearson correlation coefficient and find the value to be r = - 0.65. This means that
a. as the daily high temperature increases, fewer people tend to use the library
b. the daily high temperature is uncorrelated with number of people using the library
c. as the daily high temperature increases, more people tend to use the library
d. as the daily high temperature decreases, fewer people tend to use the library
e. none of the above

18. In a compound event A∪B the symbol ∪ corresponds to the logical operator

a. and
b. exclusive and
c. or
d. exclusive or
e. none of the above

19. Seventy percent of adults own a car. Forty percent of adults own a house. Twenty percent of adults own both a house and a car. What is the probability that a randomly selected adult will own a house or a car?

a. 1.1
b. 0.3
c. 0.28
d. 0.9
e. none of the above

20. An opaque bag contains 10 yellow marbles and 15 blue marbles. The yellow marbles are labeled 1, 2, …, 10 and the blue marbles are labeled 11, 12, …, 25. One marble is randomly selected from the bag. The theoretical probability that the selected marble is labeled with an even integer or is blue is

a. 7/25
b. 27/25
c. 20/25
d. 7/15
e. none of the above

21. An opaque bag contains 10 yellow marbles and 15 blue marbles. The yellow marbles are labeled 1, 2, …, 10 and the blue marbles are labeled 11, 12, …, 25. One marble is randomly selected from the bag. The theoretical probability that the selected marble is blue and labeled with an even integer is

a. 12/25
b. 20/25
c. 7/25
d. 7/15
e. none of the above

22. An opaque bag contains 10 yellow marbles and 15 blue marbles. The yellow marbles are labeled 1, 2, …, 10 and the blue marbles are labeled 11, 12, …, 25. One marble is randomly selected from the bag. The theoretical probability that the selected marble is labeled with an even integer given that it is blue is

a. 7/15
b. 8/15
c. 7/25
d. 36/125
e. none of the above

23. Suppose that event H and event V are such that $P(H \cap V) = 0$. Then these events are

a. ill-defined
b. mutually exclusive
c. not mutually exclusive
d. complements
e. none of the above

24. The value of b_1 in a regression equation
a. can never be negative
b. is always between –1 and +1, inclusive
c. is always between 0 and 1 inclusive
d. provides information about the skewness of the data
e. none of the above

25. The value of b_1 in a regression equation
a. will be positive if the correlation coefficient is positive
b. will be negative if the correlation coefficient is positive
c. exhibits no relation to the correlation coefficient
d. cannot be computed prior to the calculation of the correlation coefficient
e. none of the above