January Regional Statistics Individual Test

NOTA stands for "None of the Above Answers is Correct"

1. What is the range of the following data set: {4, 7, 5, -3, 8, 15, 31}
   A. 24 B. 27 C. 28 D. 34 E. NOTA

2. Using the data set in question #1, which of the following is larger?
   A. Standard deviation B. Variance C. Range D. IQR E. NOTA

3. How many of the following values {Variance, Standard Deviation, Coefficient of Determination, Range, IQR} can never be negative?
   A. 2 B. 3 C. 4 D. 5 E. NOTA

4. What is the purpose of a linear regression equation?
   A. To predict x if given y
   B. To predict the explanatory variable from the response variable
   C. To predict the independent variable from the dependent variable
   D. To predict the dependent variable if given the explanatory variable
   E. NOTA

5. Which of the following properties of a normal distribution is NOT true?
   A. The curve is continuous and unimodal.
   B. The curve never touches the x-axis and is bell shaped.
   C. The total area under the curve is approximately 1 and is symmetric about the mean.
   D. The mean, median and mode are located at the center of the distribution and are equal to each other.
   E. NOTA

6. If A and B are two mutually exclusive events with P(A) = 0.15 and P(B) = 0.7, the P (A ∩ B) =
   A. 0.8500 B. 0.2143 C. 0.1050 D. 0.0 E. NOTA

7. Which of the following is false?
   A. If the z score for a given data value is zero, the data value and the mean are equal .
   B. The z score value that would correspond to quartile one in a boxplot would round to -0.67.
   C. If a measurement in a data set is below the mean value of the data set, then the z score will be negative.
   D. Two measures of position are quartiles and range.
   E. NOTA

8. It is estimated that 20% of all Floridians are actually **native** Floridians. Using this estimate, find the probability that there are exactly the expected value of native Floridians in a class of 30. Give answer to the nearest ten-thousandth.
   A. 0.1795 B. 0.2000 C. 0.6069 D. .07379 E. NOTA

9. Two Statistics teachers, Mrs. Smith, and Mrs. Johnson give a pretest and posttest to their own students at the beginning and end of the course. Each teacher has 30 students. In Mrs. Johnson's class, five students scored a 10 on the pretest and all five got an 80 on the posttest. An additional ten of her students scored a 20 on the pretest and all ten of them got a 90 on the posttest. The remaining students received a 30 on the pretest and got a perfect posttest. None of Mrs. Smith's students knew any Statistics at the beginning of the year, so they all got a zero on the pretest, but by the end of the year all of her students got perfect scores on the posttest. What prevents you from determining which teacher had a higher correlation coefficient?
    A. The domain error is caused by the zeros on the pretest.
    B. The domain error is caused by the range and posttest score being equal (both are 100).
    C. The domain error is caused by the attempt to divide by zero in the denominator of the standard deviation.
    D. The domain error is caused by all identical pretest and posttest scores which creates a perfect correlation of 1.0 and the probability of that event occurring is less than one in a million.
    E. NOTA

USE THE FOLLOWING INFORMATION FOR 10 – 13.

SCENARIO # 1: Toyota Inc., hires several statisticians to conduct a study concerning the best brand of gasoline for its car buyers based on fuel efficiency. The statisticians randomly select four identical small vehicles, four identical midsize and four identical large vehicles from the vast inventory at Toyota headquarters. The statisticians fill each of the small vehicles with a full tank of either Exon, Mobil, Shell or Texaco gasoline (randomly chosen, of course). The cars are driven until the tank is empty and the number of miles per gallon is recorded for the brand of gasoline in each small vehicle. The same procedure is repeated for the midsize and large vehicles.

10. How many factors are involved in Scenario #1?
    A. 1 B. 3 C. 4 D. 12 E. NOTA

11. How many levels of the first factor are mentioned in Scenario #1?
    A. 1 B. 3 C. 4 D. 12 E. NOTA

12. How many treatments are mentioned in Scenario #1?
    A. 1 B. 3 C. 4 D. 12 E. NOTA

13. How many blocks are listed in Scenario #1?
    A. 0 B. 3 C. 4 D. 12 E. NOTA

USE THE FOLLOWING INFORMATION FOR #14 - 16

SCENARIO #2:
It is well known that exercise can help people lose weight, but it is not clear which type of exercise is best to help lose weight. Researchers have a group of 40 overweight men who have agreed to follow a specific exercise regimen. Researchers will randomly select 20 men to lift weights for 30 minutes three times a week, and the other 20 will run for 30 minutes three times a week.

14. Which of the following information is true concerning Scenario #2?
    A. Researchers <u>should</u> make sure that the experiment is single blind to prevent bias.
    B. Researchers <u>should</u> make sure that double blinding is incorporated in the experiment to assure that the results do not favor one treatment over the other.
    C. Researchers <u>must</u> incorporate either a single blind or double blind design into this study or it cannot be considered to be a valid experiment and the results will not be able to be generalized to the population of interest.
    D. Researchers <u>cannot</u> consider incorporating a double blind condition in the experiment, and do not need to incorporate a single blind condition in this example.
    E. NOTA

15. Deciding which men will be included in the running group and which will be included in the weight lifting group is known as… (use Scenario #2)
    A. Stratifying B. Blocking C. Random Allocation D. Controlling the lurking variable E. NOTA

16. At the end of the study in Scenario #2, the variable of interest will be….
    A. The current weight of the men.
    B. The weight loss of the men.
    C. The amount of weight each man in the first group can lift and the number of miles each man in the second group can run.
    D. The improvement in the amount of weight each man in the first group can lift and the improvement in the number of miles each man in the second group can run.
    E. NOTA

17. Find the z value with 58% of the observations falling above it? Round to four decimals.
    A. 0.2019 B. -0.2019 C. .0580 D. -0.0580 E. NOTA

18. The absolute value of $Q_1 - Q_3$ is equal to the
    A. Mean B. Spread C. Range D. IQR E. NOTA

19. Sixty percent of new home buyers in Florida want to purchase a home with a pool. For a group of five new home buyers, calculate the expected value and standard deviation of the number of buyers wanting a home with a pool. (Round to one decimal on the standard deviation calculation.)
    A. Expected = 3.0, Standard deviation = 1.1 B. Expected = 60.0, Standard deviation = 1.1
    C. Expected = 3.0, Standard deviation = 1.2 D. Expected = 60.0, Standard deviation = 1.9
    E. NOTA

20. Find the mean and standard deviation (rounded to two decimal places) of the following:

X=	3	5	7	X	2X	25
Y=	.1	.05	.1	Y	3Y	.05

    where $\log_2 x + \log_2 (x-4) = 5$

    A. μ= 12.3, σ = 5.71 B. μ = 14.3, σ = 5.71 C. μ= 15.3, σ = 5.71 D. μ =16.3, σ = 5.71
    E. NOTA

21. In a set of bivariate data, the following was found: $\mu_x = 20$, $\mu_y = 10$, $S_x = 2$, $S_y = 40$, $r^2 = .25$
    Find the value of the slope.
    A. 0.25 B. 0.05 C. 2.5 D. 5 E. NOTA

22. A directory assistance executive claims that customers calling for directory assistance are given correct information 90% of the time. If 10 customers call, what is the probability that none of them will be given incorrect information? Round the probability. (You may presume independence.)
A. .0000000001 B. 0.1000 C. 0.2348 D. 0.3487 E. NOTA

23. A computer printout of a dataset between the parents' height and the height of the child follows:

Predictor	Coef	St Dev	T	P
Constant	-17	4.1	-4.146	.0002
Parent Ht	1.3	0.71	0.831	.0022

A residual plot of the data used in this computer output shows a residual of 10 for a 65 inch tall parent. What is the actual height of the child?
A. 55.5 B. 57.5 C. 75 D. 77.5 E. NOTA

24. Using the computer output for #23, it is predicted that for every inch taller that the _____is, the _____ is predicted to be ____ inches _____.
A. parent, child, 1.3, taller B. child, parent, 1.3, taller C. parent, child, 17, shorter
D. child, parent, 17, shorter E. NOTA

25. Which of the following is a correct interpretation using the computer output above?
A. The constant refers to the explanatory variable.
B. The slope of -17 shows an inverse relationship between parent and child (the taller the parent is, the shorter the child is.)
C. The standard deviation of the explanatory variable is 4.1
D. The intercept is present in the computer output, but is meaningless when described in context.
E. NOTA

26. The weight of packages of books shipped by UPS is normally distributed with a mean of 10 pounds and a standard deviation of 2. How likely is it that a randomly selected person will send a package of books weighing more than 13.5 pounds? Round the probability to two decimal places.
A. 0.02 B. 0.04 C. 0.06 D. 0.94 E. NOTA

27. What is the probability that a player with an 80% shooting average will miss the next two shots taken? (All shots are considered independent.)
A. 0.04 B. .064 C. .064 D. 0.20 E. NOTA

28. A basketball player with an 80% shooting average is practicing (why bother, you wonder?) and is told by his coach that he can't go home until he makes 3 baskets. What is the probability that it takes 4 tries to make the three baskets? The type of problem described in this question is a….
A. Binomial pdf B. Binomial cdf C. Geometric pdf D. Geometric cdf E. NOTA

29. The scores on this test are normally distributed with a mean of 75 and standard deviation of 5. There are 100 people taking this test and only the top 10 will win trophies. If the previous data concerning the mean and standard deviation hold true today, then you must score at least a ____ to win a trophy. Round the score to one decimal place.
A. 80 B. 81.4 C. 90.3 D. 120 E. NOTA

30. If a sample has a mean of 100 and a standard deviation of 6, what is the value in the data set corresponds to a z score of 2?
A. 88 B. 94 C. 92 D. 112 E. NOTA