Name_____ Period_____ Date_____

Vocabulary: Define each word and give an example.

1. Experimental Probability

2. Margin of Error

3. Parameter

Short Answer:

4. What does the Empirical Rule tell us?

5. What does it mean if something is statistically significant?

Review:

6. Solve the rational equation: $\frac{x+3}{x}-1=\frac{1}{x-1}$

7. Use the change of base formula to rewrite the logarithm in terms of the common logarithm. $\log_2 17$

8. Evaluate $\sin\frac{\pi}{3}$.

9. Find the amplitude and period of the following trig function: $y=2\sin(3x+\pi)-4$

Amplitude:_____ Period:_____

Problems:
Be sure to show all work used to obtain your answer. Circle or box in the final answer.

10. When the standard deviation of a numerical variable is small, then the values in the population tend to be far from the mean. True or False **10.**_____

11. If 7.78% of the standard normal distribution lies below -1.42 standard deviations, then 7.78% of the standard normal distribution lies above 1.42 standard deviations. T or F **11.**_____

12. BRIEFLY define what a z-score is.

_____

_____

13. The three words that we used to describe the normal curve are:

_____, _____, and _____

14. The length of time needed to complete a certain test is normally distributed with mean 60 minutes and standard deviation 10 minutes. **Use your Empirical rule and show your curve for (a) and (b) below. Do NOT use z-scores. Must show work for credit.**

(a) What is the proportion of people who take between 30 and 70 minutes to complete the test?

(b) What is the proportion of people who take between 50 and 80 minutes to complete the test?

(c) What score qualifies for the 97.5^{th} percentile?

(d) 50 would be at what percentile?

15. Identify the population and the sample: When 1094 American households were surveyed, it was found that 67% of them owned two cars.

16. Determine whether the numerical value is a parameter or a statistic and then use proper variable notation to make an equality statement.

The cans of Coca-Cola filled in a plant were supposed to contain an average of **12** ounces. Quality control inspectors sampled 40 cans at random from Friday's production. These cans contained an average of **12.3** ounces.

17. A poll of 2,000 Americans was taken and the findings showed that 52% preferred Obama over McCain in an election with a margin of error of 3.5% points for 95% confidence.

a) What is the 95% confidence interval for the percentage of people voting for Obama?

b) Explain in correct wording what this means.

c) What does this say about predicting the winner of the upcoming election?

d) What does it mean when we say that we are 95% confident?

18. Will listening to a Mozart piano sonata make you smarter? In a 1995 study, Rauscher, Shawn and Ky reported that when students were given a spatial reasoning section of a standard IQ test, those who listened to Mozart for 10 minutes improved their scores more than those who simply sat quietly. These researchers said the differences were statistically significant. Explain what that means in this context.

19. A water dowser claims to be able to sense the presence of water using a forked stick. Suppose we wish to set up an experiment to test this ability. We get 20 identical containers, fill some with water, and ask the dowser to tell which ones are full and which are empty.

a) How will we randomize this procedure? Be specific.

b) The dowser correctly identifies the contents of 12 out of 20 containers. Do you think this level of success is statistically significant? Explain.

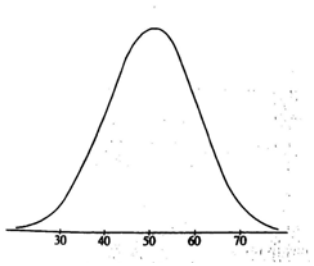
c) How many correct identifications (out of 20) would the dowser have to make to convince you that the forked stick trick works? Explain.

Multiple Choice Questions: **Circle the best answer**.

20. Suppose that sixteen-ounce bags of chocolate chips cookies are produced with an actual mean weight of 16.1 ounces and a standard deviation of 0.1 ounce. The percentage of bags that will weigh more than 16.2 ounces is:
(a) 16
(b) 34
(c) 50
(d) 68
(e) none of the above

21. Let's say you take the SAT. Your standard score on the SAT was -0.8. This means that your actual score was

(a) more than 1 standard deviation below the mean SAT score.
(b) less than 1 standard deviation below the mean SAT score.
(c) less than 1 standard deviation above the mean SAT score.
(d) more than 1 standard deviation above the mean SAT score.
(e) Can't tell without knowing the standard deviation.



22. Which of the following is the best estimate of the standard deviation of the distribution shown in the figure at the right?

a) 5 b) 10 c) 30 d) 50 e) 60

23. An insurance agent is successful in selling a life insurance policy to 20 percent of the customers he contacts. He decides to construct a simulation to estimate the mean number of customers he needs to contact before being able to sell a policy. Which of the following schemes should he use to do the simulation?

a) Assign numbers "0, 1" to successfully selling a policy to a customer and numbers "2, 3, 4, 5, 6, 7, 8, 9" to failing to sell a policy to a customer.
b) Assign numbers "0, 1" to successfully selling a policy to a customer and numbers "2, 3, 4" to failing to sell a policy to a customer.
c) Assign number "0" to successfully selling a policy to a customer and number "1" to failing to sell a policy to a customer.
d) Assign numbers "0, 1, 2, 3, 4" to successfully selling a policy to a customer and numbers "5, 6, 7, 8, 9" to failing to sell a policy to a customer.
e) Assign number "20" to successfully selling a policy to a customer and numbers "1, 3, 5, 7, 9, 11, 13, 15, 17, 19" to failing to sell a policy to a customer.

24. An auto racing mechanic team claims that at a pit stop they can change all four tires and fill the gas tank in 15 seconds. A driver is skeptical of this claim and thinks the team can't be that fast. Which of the following gives the null and alternative hypotheses that the driver should test?

a) $H_0: \mu \le 15$ seconds, $H_a: \mu > 15$ seconds
b) $H_0: \mu \ge 15$ seconds, $H_a: \mu < 15$ seconds
c) $H_0: \mu = 15$ seconds, $H_a: \mu > 15$ seconds
d) $H_0: \mu = 15$ seconds, $H_a: \mu < 15$ seconds
e) $H_0: \mu = 15$ seconds, $H_a: \mu \ne 15$ seconds

25. In a past General Social Survey, a random sample of men and women answered the question, "Are you a member of any sports clubs?" Based on the sample data, 95% confidence intervals for the population proportion who would answer "yes" are 0.13 to 0.19 for women and 0.247 to 0.33 for men. Based on these results, you can reasonably conclude that

a) At least 25% of American men and American women belong to sports clubs.
b) At least 16% of American women belong to sports clubs.
c) There is a difference between the proportions of American men and American women who belong to sports clubs.
d) There is no conclusive evidence of a gender difference in the proportion belonging to sports clubs.

Name: _____Period_____Date_____

CALCULATOR SECTION

1. Scores on the Wechsler Adult Intelligence Scale (a standard IQ test) are approximately normally distributed within age groups. For the 20–34 age group, the mean is 110 and the standard deviation is 22. For the 60–64 age groups, the mean is 90 and the standard deviation is 25. Sarah is 29 and her mother, Ann, is 62. Sarah scores 137 on the Wechsler test, while Ann scores 120. Who has the better score, relative to her age group? Show numerical proof for credit!

2. On the driving range, Tiger Woods hits golf balls with his driver. The distance traveled by the golf balls follows a normal distribution with a mean of 300 yards and a standard deviation of 7 yards.

(a) Sketch a normal curve below to illustrate the distance traveled by Tiger's golf balls. Be sure to mark the mean and the points one, two, and three standard deviations away from the mean. Also, make sure to label the Empirical Rule on your graph!!

(b) What percent of Tiger's drives are less than 290 yards?

(c) On a particular hole, a small creek is 320 yards away from the tee. What percent of Tiger's drives exceed 320 yards?

(d) What distance would a golf ball travel to be at the 25th percentile of Tiger Wood's driving length distribution?

(e) What distance would a gold ball travel to be at the 95th percentile of Tiger Wood's driving length distribution?

3. The scores of a reference population on the Wechsler Intelligence Scale for Children (WISC) are normally distributed with $\mu = 100$ and $\sigma = 15$.

(a) What percent of students have scores above 125?

(b) What percent of the students have scores between 88 and 120?

(c) What percent of students have scores below a 65?

(d) I would like to recognize the top 15% of the test takers. What scores would qualify for this recognition?

(e) The bottom 10% of the test takers will be given additional testing. What scores would qualify for this additional testing?