***Honors Math 3 – Statistics Unit Review Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

***\*COMPLETE ALL WORK ON A SEPARATE SHEET OF PAPER\****

*1. Fifty bottles of water were randomly selected from a large collection of bottles in a company’s warehouse and the volume of water in each bottle was carefully measured. The stated volume on label of the bottles was 12 ounces; the mean volume as measured was 12.1 ounces.*

a. Identify the population of interest b. Identify the variable

c. Identify the sample d. Name the parameter. e. Name the statistic.

*For 2 and 3,* *identify whether the underlined value is a statistic or a parameter:*

2. The Gallup poll asked 1200 U.S. adults whether they believed that there could be life on other planets. Of the respondents, 24% of them did believe that life existed on other planets.

3. The average weight of a horse that stands 16.2 hands high is 1000 pounds.

4. You wish to do a comparison study between two hospital's success rates. Instead of assigning patients to go to one or the other, you divide your sample by the health of your patients into two groups – those who are critically ill and those who are less ill. Which type of sampling are you using? What is the advantage to using this method in this situation?

5. You are given a random list of all graduating seniors at your high school. You decide to survey every five names on the list and ask what types of activities they participated in while they were at school. Which type of sampling is being used?

6 The FV Town Council is interested in finding how Fuquay-Varina residents feel about putting a new park in the Crooked Creek subdivision. They take a sample of homeowners who are residents of FV by numbering all homeowners and randomly selecting 100. What type of sample is this? Do you see any problems with using this method?

7. The FVHS Student Council asks students to nominate seniors for Prom King and Prom Queen by using a Twitter poll. What type of sampling method are they using? Name an advantage and a disadvantage to using this method.

8. What are the two main requirements for a sample to be considered a simple random sample?

9. Determine whether each sampling method is biases or not. If the method is biased, explain why.

 a. A student stands outside an expensive restaurant and asks customers their opinion on welfare.

 b. The NRA asks subscribers to their magazine to call a toll-free number and take a poll on gun control.

 c. A researcher stands outside a grocery store and asks shoppers about their weekly grocery bill.

10. A student in AP Statistics is interested in finding out how many students believe that the dress code is reasonable. He asks a sample of senior girls the following question: “Do you agree that the dress code is old-fashioned and that it’s hard to buy clothes that fit the current dress code?” Is this a fair question? Explain your answer.

11. ***Reword each of the following survey questions to eliminate bias.***

 a) A random sample of residents of a city with high traffic congestion is asked: “Are you in favor of

 widening the main street to reduce congestion?”

 b) During an election campaign, voters are asked: “Do you agree that, because they have reduced taxes to a postwar low, the current government should be re-elected to continue their great work?”

 c) A marketing firm hired by a movie company asks: “Which of the following movies should

 be named Movie of the Year?”

 d) A government pollster asks: “Unemployment is at an extremely high level. Are you in favor of government policies to spend money to create jobs in your community?”

12. A random sample of 100 students is selected from a certain school. They are given an IQ test which has a known standard deviation of 11. The sample mean is found to be 112. Determine the margin of error and find a confidence interval for estimating the mean school IQ value.

13. A survey of hospital records of 35 randomly selected patients suffering from a particular disease indicated that the average hospital stay was 10 days with a standard deviation of 2.1 days. Determine the margin of error and find a confidence interval for estimating the average hospital stay.

14. A Gallup poll conducted in 2012 found that 38% of Americans believe in ghosts. A group of students decide to test this result by interviewing people at the Fuquay-Varina Wal-Mart. If they want a result with a margin of error of ±2%, how many people should be interviewed?

15. Students were asked whether they would buy lunch in the cafeteria if a salad bar was added. Of the 80 students asked, 45 stated that they would buy lunch. Determine a margin of error and find a confidence interval to estimate the true proportion of students who would buy lunch.

16. A team of medical researchers believes that they can cure the common cold in 76% of patients. To test their new medicine, how large should the sample size be to create a margin of error of ±5%?

17. In 2014, the Center for Disease Control and Prevention reported that the percentage of Americans who smoke cigarettes dropped to 17.8% with a margin of error of ±3%. If the CDC wishes to cut their margin of error to 25% of what it was, how will this affect their sample size?

18. A sample of 64 FVHS students was selected and their mean score on the Math 3 NC Final Exam was calculated to be 83. A confidence interval of 82.02 to 83.98 was created to estimate the true mean score on the test. Find the standard deviation for the sample.

19. You forgot to study for a test and you’re going to have to guess at all of the answers. The test is multiple choice with 10 questions; each question has 4 choices. You wonder whether you can pass the test (get at least 6 right) by blindly guessing. Determine three different ways to simulate the situation.

20. Identify each of the following as an observational study or an experiment.

 a. Compare the grades on a final math test of 25 students who use calculators and 25 students who do not use calculators. The students decide which group they are in.

 b. Compare voter satisfaction levels between people assigned to use either paper ballots or touch‐ screen machines.

 c. Determine which brands of orange juice people prefer. The people are randomly chosen at the supermarket and are asked to taste both brands without knowing which brand they are drinking