Integrated Studies 8C Name:_____
Statistics Quiz
Each question is worth 10 points. If you need more space for any answer use the back of the page.

The following scenario applies to Questions 1 – 7: One hundred pairs of twins each participated in one remote viewing trial. One twin in each pair was designated as the sender, and was asked to bring four objects to the session but to make sure the other twin, the receiver, did not know what they were. After the receiver was taken to a secured room in another location, one of the objects was randomly selected to be the "target" for the session. Each of the four objects had the same probability of being selected as the target. The sender focused on that object during the remote viewing. At the end of the session the correct answer was shown to the receiver. Then the four objects and the receiver's drawings were shown to an independent judge, who determined which of the four objects matched the receiver's drawings the best. If the correct object was judged to match best, the session was scored as a "hit." The experiment resulted in 33 hits, and the *p*-value for the test is 0.032.

1. Is this a binomial experiment? If so, specify *n* and specify the probability of a "success" by chance alone, under the assumption that remote viewing does not work in this context. If you don't think it's a binomial experiment, explain why not.
2. Define the parameter of interest in this experiment and corresponding hypothesis test. Use the letter *p*.
3. Write the null and alternative hypotheses in terms of the parameter *p* defined in Question 2.
4. Explain what probability was calculated to find the *p*-value of 0.032. Make your answer specific to this situation rather than a general definition of a *p*-value.
5. Make a decision about the hypotheses using statistical terminology, and interpret in words what it means.
6. If the experiment were to be repeated with the same group of 100 pairs of twins, would each of the following possibly change, or would it stay the same? Circle the appropriate answer.
   Anything computed from the data can change, anything based on the population values cannot.

The value of the parameter *p*:	Would change	Would not change
The value of the test statistic *z*:	Would change	Would not change
The power of the test if the true value of *p* is .30:	Would change	Would not change
A confidence interval for *p* computed from the results:	Would change	Would not change
The estimated effect size calculated from the results:	Would change	Would not change

7. If the experiment were to be repeated with 400 pairs of twins, would each of the following be likely to get larger, smaller, or stay about the same as in the first test of 100 pairs? Circle the appropriate answer.

The value of the test statistic *z*:	Larger	Smaller	About the same
The power of the test if the true value of *p* is .30:	Larger	Smaller	About the same
The width of a confidence interval for *p*:	Larger	Smaller	About the same
The estimated effect size:	Larger	Smaller	About the same
The *p*-value for the test:	Larger	Smaller	About the same

The following scenario applies to Questions 8 and 9. An online experiment is conducted in which two colors are displayed on cards on a computer screen. One has been randomly selected to be the "right answer" (the two colors are equally likely to be chosen) and the participant is asked to guess which one it is by clicking on that card. The answer is then revealed. A participant plays the game 200 times and is successful 110 times.

8. A 95% confidence interval for the probability of a success based on these results is .48 to .62. Interpret this interval by writing a few sentences explaining what it means.
9. If a one-tailed hypothesis test were to be done in this situation, the participant would need to get 113 or more correct for the test to be "statistically significant." If the person is really capable of getting the answer right 54% of the time in the long run, the power for this test is about .30 or 30%. Explain what this means.
10. Two conditions are required for a psi experiment to be amenable to statistical evaluation. One is that ordinary means of guessing the answer are ruled out, such as allowing someone in the room to know the right answer. What is the other required condition?