> Please show **all** your work! Answers without supporting work will not be given full credit. Write answers in spaces provided. You have 1 hour and 20 minutes to complete this exam. You may use a personal calculator, any tables provided, and any reference sheets provided. By placing your name on the line below, you agree to uphold the Honor Code during this test.

Name:_____

1. A die is rolled many times to see if it is loaded. It lands on each side in the following way.

Side	1	2	3	4	5	6
Rolls	5	6	6	10	8	7

   Create the expected counts table which would be used to test the claim that the die is not loaded, i.e. that the distribution of rolls should be uniform. (10pts)

Side	1	2	3	4	5	6
Rolls						

2. True or false: A one-way ANOVA tests that the population variances are the same for three or more populations. (5pts)

   Answer:_____

3. A two-way table test is conducted on a 3×4 table, and the test statistic is found to be 11. What can we conclude about the row and column variables? (5pts)

   Answer:_____

4. We have the following two-way table. Does the table meet the requirements for a two-way table test? Why or why not? (5pts)

	Red	Green	Yellow	Total
Car	10	4	4	18
Truck	1	1	4	6
SUV	1	1	0	2
Total	12	6	8	26

   Answer:_____

5. The line of best fit for 25 (x, y) pairs of data is given by $\hat{y} = 10 + 2x$. We also know that $\bar{x} = 12$ and $\bar{y} = 8$. We preform a 5% test of significance for ρ and get a P-value of 0.045. Our value of r was 0.97. What proportion of the variance in y can be explained the the variance in the linear regression model? (5pts)

Answer:_____

6. We have the following table for a test for significance for β_1 where the alternative hypothesis is that $\beta_1 \neq 0$. The critical F value for this test is 11.26. Fill in the missing parts of the table. Does this test support the claim that $\beta_1 = 0$? (5pts)

Source	DF	SS	MS	F
Model				
Error		3.133		
Total	9	80.225		

Answer:_____

7. Is a prediction interval for a future observation or a confidence interval for the mean response wider? (5pts)

Answer:_____

8. Which two tests are numerically equivalent? Circle only one. (5pts)

- a goodness-of-fit test and a two-way table test
- a test for population linear correlation and a test for slope of a population regression line
- a two-way ANOVA an two one-way ANOVAs
- all of these
- none of these

9. For the data below, we have that $r = 0.6728$. Does the data support the claim that x and y are linearly correlated? Use $\alpha = 0.01$ and a critical value test. (15pts)

x	1	2	3	4	5	6	7	8	9	10
y	2	4	5	12	6	3	8	10	11	10

Answer:⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

10. A medical researcher wants to tell if a test for diabetes is effective. She collects the following data from a sample of 100 patients.

	Diabetic	Not Diabetic
Test Positive	35	15
Test Negative	15	35

Use $\alpha = 0.0005$ to test the claim that the result of the test is independent of whether or not the patient has diabetes. Use a critical value test. (15pts)

Answer:⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

11. If $\hat{y} = 10 + x$ an $SE_{\hat{y}} = 0.5$, produce a 90% prediction interval for $x = 11$, assuming that 11 is in the range of observed x values and that the data is actually linearly correlated. Assume that the sample consisted of 12 (x, y) pairs.(10pts)

Answer:_____

12. Fill in the missing parts of the two-way ANOVA test. At a 5% significance level, does it appear that there is an effect due to the interaction of the two factors? (The critical value for this test is 2.15 at the 5% significance level.) Also, tell what type of distribution the test statistic has — include degrees of freedom. (15pts)

Source	DF	SS	MS	F
A	2	53.733333		
B	4	146.83333		
AB				
Error		79		
Total	59	415.33333		

Answer:_____

13. Which is larger $SE_{\hat{\mu}}$ or $SE_{\hat{y}}$? (1pt)