MAT1372, Quiz11, Fall2025

ID:_____ Name: Sol

- This quiz consists of 1 question for a total of 10 points and you have 10 minutes to complete the quiz.
- Show all work and justify your answers. Wishing you success.
- Chi-square Table:

Upper tail		0.3	0.2	0.1	0.05	0.02	0.01	0.005	0.001
df	2	2.41	3.22	4.61	5.99	7.82	9.21	10.60	13.82
	3	*3.66*	*4.64*	6.25	*7.81*	*9.84*	*11.34*	*12.84*	*16.27*
	4	4.88	5.99	7.78	9.49	11.67	13.28	14.86	18.47
	5	6.06	7.29	9.24	11.07	13.39	15.09	16.75	20.52
	6	7.23	8.56	10.64	12.59	15.03	16.81	18.55	22.46
	7	8.38	9.80	12.02	14.07	16.62	18.48	20.28	24.32

1. Rock-paper-scissors is a hand game played by two or more people where players choose to sign either rock, paper, or scissors with their hands. For your statistics class project, you want to evaluate whether players choose between these three options randomly, or if certain options are favored above others. You ask two friends to play rock-paper-scissors and count the times each option is played. The following table summarizes the data:

Rock	Paper	Scissors
43	21	35

Use these data to evaluate whether players choose between these three options randomly, or if certain options are favored above others. Make sure to clearly outline each step of your analysis, and interpret your results in context of the data and the research question.

prepare H_0: players choose between these three options randomly

H_A: certain options are favored above others

$\alpha = 0.05$, Total sample $n = 43+21+35 = 99$

Check: If H_0 were true, then, for 99 samples, the expected counts of Rock, Paper, Scissors are 33, 33, 33, respectively.

Independence: this is what we are checking in this hypothesis, we can not validate this condition

Sample size: all three expected counts are more than 5, so the condition is satisfied.

Calculate: Under df = # of categories $-1 = 3-1 = 2$. we first calculate the test statistic $\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(43-33)^2}{33} + \frac{(21-33)^2}{33} + \frac{(35-33)^2}{33} = 7.52$

and we get the p-value from the table: $0.02 < P(\chi^2 > 7.52) < 0.05$

Conclude: since p-value is less than $\alpha (= 0.05)$, we reject H_0.