Stat 1040 **Name**_____
Quiz 11 **Recitation Instructor**_____

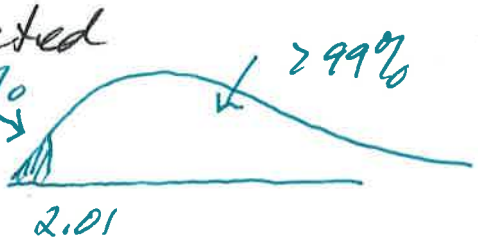
1. Someone claims to be rolling a pair of fair dice. To test his claim, you make him roll the dice 360 times and you count up the number of times each sum appears. The results are given below. The expected frequencies for a pair of fair dice are also shown. Should you gamble with this individual? (5 points)

Sum	Chance	Observed Frequencies	Expected Frequencies
2	1/36	11	10
3	2/36	18	20
4	3/36	33	30
5	4/36	41	40
6	5/36	47	50
7	6/36	61	60
8	5/36/	52	50
9	4/36	43	40
10	3/36	29	30
11	2/36	17	20
12	1/36	8	10

χ^2 test : Null: the dice are fair

χ^2 = sum of $\frac{(\text{observed} - \text{expected})^2}{\text{expected}}$

$= 2.01$, $df = 10$



p-value < 1% (more extreme is to the left of 2.01)

Reject because he has way too much control over the dice. The observed frequencies are too close to the expected values.

2. Each respondent in the Current Population Survey was classified as employed, unemployed, or outside the labor force. The results for a simple random sample of 981 men, in California (35-44 years old), is given below. Does the data show that marital status is independent of employment status? (5 points)

	Married	Widowed, Divorced, or Separated	Never Married	(Totals)
Employed	638 (623)	133 ~~(129)~~ (136)	102 (114)	873
Unemployed	27 (29)	8 (6)	6 (6)	41
Not in Labor Force	35 (48)	12 (11)	20 (8)	67
(Totals)	700	153	128	981

χ^2 test: Null: Marital status is independent of employment status.

expected married & employed: $\frac{700}{981} \times 873 \approx 623$

expected married & unemployed: $\frac{700}{981} \times 41 \approx 29$

expected WDnS & employed: $\frac{153}{981} \times 873 \approx 136$

expected WDnS & unemployed: $\frac{153}{981} \times 41 \approx 6$

$\chi^2 = \text{sum of } \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$, $df = 4$

≈ 24 p-value nearly 0.

Reject null. There is very strong statistical evidence that the variables are related.