Name:_____ Math 130
Date: 5/13/2025 Quiz 18

1. (10 points) Are the teams that play in the World Series evenly matched? To win a World Series, a team must win 4 games. If the teams are evenly matched, we would expect the number of games played in the World Series to follow the distribution shown in the first 2 columns of the table below. The third column represents the actual number of games played in each World Series from 1930 to 2007. Does the data support the distribution that would exist if the teams were evenly matched? Use the $\alpha = 0.05$ level of significance. Use the p-value method.

Number of Games	Probability	Observed Frequency
4	0.125	15
5	0.25	15
6	0.3125	17
7	0.3125	30

Extra Credit (10 points) By the mid-1990s, Kristen Gilbert had been working for several years as a nurse at the Veteran's Administration Hospital in Northampton, Massachusetts. For a time, she had been one of the nurses that others most often looked up to. Lately, other nurses became increasingly suspicious that something was wrong. To them, if felt like more people were dying when Gilbert was working than when she wasn't and so they suspected that Gilbert may have played a part in the murder of these patients. An investigation was launched and data for 1641 random shifts at this hospital were collected and is summarized in the table below. Test the claim that a death occurring during a shift at this hospital is independent of whether or not Gilbert was working on that shift. Use the rejection region method. (Since this is a serious accusation, use a 0.01 significance level)

		Death on Shift?	
		Yes	No
Gilbert present?	Yes	40	217
	No	34	1350

Some formulas you may need:

$$E = pn \qquad df = k - 1 \qquad \chi^2 = \sum \frac{(O-E)^2}{E}$$

$$\chi^2 = \sum \frac{(O-E)^2}{E} \qquad E = \frac{(row\ \ total)(column\ \ total)}{grand\ \ total} \qquad df = (r-1)(c-1)$$