STAT 479
Quiz 4
Spring 2020
March 10, 2020

1. During the last calendar year, Purdue incurred 100 worker's compensation claims which are summarized in the following table:

Amount of Claim	Number of Claims
0 – 5000	14
5000-15,000	16
15,000-45,000	40
More than 45,000	30

Sally wants to test the following hypothesis using the Chi Square Test at a 10% significance level:

H_0: Workers Compensation claims are uniformly distributed with θ = 60,000.
H_1: Workers Compensation claims are not uniformly distributed with θ = 60,000.

Calculate the Chi Square test statistic.

Solution:

Range	O_j	$\hat{p}_j$	E_j	$\dfrac{(O_j - E_j)^2}{E_j}$
0-5000	14	5/60	8.3333	3.85334
5000-15000	16	10/60	16.6667	0.02667
15000-45000	40	30/60	50	2
45000+	30	15/60	25	1
			TOTAL= χ^2 ➔	6.88

Determine the critical value for this test.

Solution:

Degrees of Freedom =k-1-Estimated Parameters = 4-1-0=3

The critical value is 6.251

State your conclusion with regard to the hypothesis.

Solution

   Reject the Hypothesis

2. Yu Fire Company has experienced the following four claims this year:

      5000 25,000 50,000 60,000

The company's actuary, Jiaxin, wants to test the following hypothesis using the Kolmogorov-Smirnov Test with a 10% significance level:

H_0: Claims are distributed as an exponential distribution with θ = 40,000.
H_1: Claims are not distributed as an exponential distribution with θ = 40,000.

Calculate the Kolmogorov-Smirnov test statistic.

Solution:

x	$F_4(x^-)$	$F_4(x)$	$F^*(x) = 1 - e^{\frac{-x}{40,000}}$	Absolute Value of Difference
5,000	0	0.25	0.1175	0.1325
25,000	0.25	0.50	0.4647	0.2147
50,000	0.50	0.75	0.7135	0.2135
60,000	0.75	1.00	0.7769	0.2231

Maximum Absolute Value of the Difference = 0.2231

Calculate the critical value.

Solution:

$$\frac{1.22}{\sqrt{n}} = \frac{1.22}{\sqrt{4}} = 0.61$$

State your conclusion with regard to Jiaxin's hypothesis.

Solution:

Do Not Reject