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CSC 148
Homework 3b

1.
    1. SIS size = 5 minutes
    2. n_sis = 43.2 sis intervals
    3. x^ = 2.315 arrivals / interval

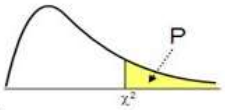
2. Python program output:

```
 ----jGRASP exec: python chisq.py
Number of Classes: 6
Mean of the class frequencies: 2.315
sum of the class frequencies: 43
Chi-Square class values calculations tool

The pmf  values for pi = prob(X=xi), xi=0,1,2, ..., assuming NON-combined classes
('p0', ' is: ', 0.09876618400213154)
('p1', ' is: ', 0.22864371596493452)
('p2', ' is: ', 0.26465510122941166)
('p3', ' is: ', 0.20422551978202932)
('p4', ' is: ', 0.1181955195738495)
('p5', ' is: ', 0.0547245255626923)

The Ei  values for classes E1, E2, etc.
('E0', ' is: ', 4.246945912091656)
('E1', ' is: ', 9.831679786492185)
('E2', ' is: ', 11.380169352864701)
('E3', ' is: ', 8.781697350627262)
('E4', ' is: ', 5.082407341675528)
('E5', ' is: ', 2.353154599195769)

 ----jGRASP: operation complete.
```

xi	Oi	combined	Ei	combined	$(O_i-E_i)^2/E_i$
0	3		4.247		
1	7	10	9.832	14.079	1.182
2	16		11.38		1.875
3	8		8.782		0.07
4	8		5.082		
5	1	9	2.353	7.435	0.329
SUM	43		41.676		3.456

3. a)
    1. $\chi_0^2 = \sum (O_i-E_i)^2/E_i = 3.456$ is the test statistic value
    2. v = k – s – 1 = 4 – 1 – 1 = 2 degrees of freedom
    3. $X_{critical}$ on row 2, column 0.20 is 3.219, column 0.10 is 4.642.

Table 4 Chi-Square: table of critical values; ν vs. P – Source: Medcalc software



	P										
DF = ν	**0.995**	**0.975**	**0.20**	**0.10**	**0.05**	**0.025**	**0.02**	**0.01**	**0.005**	**0.002**	**0.001**
1	0.0000393	0.000982	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.550	10.828
2	0.0100	0.0506	3.219	4.605	5.991	7.378	7.824	9.210	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.860	16.924	18.467
5	0.412	0.831	7.289	9.236	11.070	12.833	13.388	15.086	16.750	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.690	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.180	11.030	13.362	15.507	17.535	18.168	20.090	21.955	24.352	26.124
9	1.735	2.700	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.920	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.300	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697

b)

Our calculated test statistic of d, which is χ_0^2, is 3.456.
$\chi^2_{0.20,\,2}$ is 3.219. $\chi^2_{0.10,\,2}$ is 4.605.
This means that our test statistic does not satisfy the null hypothesis at the significance level of 0.20. However, it does satisfy it at the significance level of 0.10, and conforms to the Poisson distribution at that significance