

Name: _____

MAT 222

Fall 2019

Chapter 9 Worksheet

“[Clouseau] It’s amazing how he fell perfectly into the chalk outline on the floor. [Ponton] I think they drew the outline after he was shot.

[Clouseau] Ah! We must be working with some kind of mastermind!”

– Inspector Clouseau & Gilbert Ponton, The Pink Panther

Problem 1: A group of researchers is trying to determine if there is a relationship between one's education level and whether one has found employment. They survey a group of individuals, asking whether they are employed full-time, part-time, or are unemployed. They also ask the individuals whether they have a high school education, some college education (Associates), a B.A., a masters, or a Ph.D.. The results are summarized in the first table below. Complete the missing entries in the tables below.

Table of Counts

	High School	Associates	B.A.	Masters	Ph.D.	Total
Full-Time	33	48	59	55	59	
Part-Time	22		36	37	28	160
Unemployed	15	26	12		9	75
Total	70		107	105	96	

Table of Expected Values

	High School	Associates	B.A.	Masters	Ph.D.
Full-Time	36.36	57.66	55.58	54.54	49.87
Part-Time	22.90		35.01	34.36	31.41
Unemployed	10.74	17.02	16.41		14.72

Table of Chi-Squared Contributions

	High School	Associates	B.A.	Masters	Ph.D.
Full-Time	0.3105	1.6173	0.2106	0.0039	1.6735
Part-Time	0.0354	0.0128	0.0280		0.3704
Unemployed	1.6933		1.1856	0.5984	2.2252

Perform a chi-squared analysis to determine if there is a relationship between one's employment and education level. Be sure to state your H_0 , H_a in the context of the problem, the degrees of freedom, your p -value, and your conclusion in the context of the problem. [Use $\alpha = 0.10$.]

Problem 2: Cornaught University is investigating whether they are admitting under-represented groups 'fairly' or if income may have some influence in admittance. They collect family income data on all African-American students at the University. The breakdown of the students' income levels is given in the table below. Given that 22% of African-Americans make under 15K, 27% make between 15K and 35K, 38% make between 35K and 100K, 11% make between 100K and 200K, and 2% make over 200K, determine whether the students are being admitted 'fairly'. [Use $\alpha = 0.01$.]

Income Level	<15K	15K-35K	35K-100K	100K-200K	>200K
Number of Students	213	312	425	200	100