

Name: \_\_\_\_\_

MAT 222

Spring 2019

Chapter 9 Worksheet

*“Maybe life is like a cross country road trip. You can get so focused on the enormity of the mission ahead, staring straight out of the expansive road as you fail to notice the stuff you’re passing by right at that moment.”*

–Ginger Foutley, As Told By Ginger

**Problem 1:** A group of researchers is trying to determine if there is a relationship between ones 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 ones 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