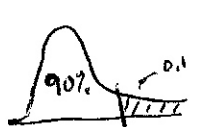**Instructions:** *Answer each question using the two-way table below. Each question that pertains to a hypothesis test must include: H_0 & H_1 using correct notation, critical value &/or test statistics (work too) represented on a picture which also denotes alpha, decision, and correctly written conclusion.*

1. Based on the following 2 way table, answer the questions. The data represents the results from a survey of 89 students at Foothill & Cañada College who will or believe they will (if they were to vote) vote for Obama. The results are from a survey conducted by Professor Butterworth during the Fall 2012 term (and padded a little). The questions summarized are "What are the concerns facing our nation that you feel President Obama is most suited to address?" and "Which of the concerns facing our nation do you feel is most important to you?"

Obama's Ability in Area of:

Respondent's Concerns		Economy	Environ	Health	Total
	Economy	21	7	13	41
	Environment	7	10	8	25
	Health	9	6	8	23
	Total	37	23	29	89

1. At the 90% confidence level, test the hypothesis that there is a difference between how people's concerns and those that they feel Obama is qualified to address.

H_0: Respondent's Concerns & Resp. View of Obama's Ability are independent

H_A: Respondent's Concerns & Resp. View of Obama's Ability are dependent

$\chi^2 = 7.779$
$\chi^2_{4,0.1}$

$$\chi^2 = \frac{\left[21 - \frac{(37)(41)}{89}\right]^2}{\frac{37(41)}{89}} + \frac{\left[7 - \frac{23(41)}{89}\right]^2}{\frac{23(41)}{89}} + \cdots + \frac{\left[8 - \frac{(29)(23)}{89}\right]^2}{\frac{29(23)}{89}} = 5.264562143$$

Decision: Fail to reject H_0 (the T.S. is not is R.R.)

Conclusion: At the 90% C.L. there isn't enough evidence to support the claim that respondent's concerns & view on Obama's ability are dependent.

2. Was 1) a test of independence or homogeneity?

Independence because these are not subpops

3. Are there any violations to the assumptions for a test of independence/homogeneity in this data? All expected values are greater than 5, data is given as frequencies and data is assumed to be a random sample. ∴ no violations

4. Show the computation of the expected value for Obama's Econ and Respondent's Health.

$$E(\text{Econ} \cap \text{Resp. Health}) = \frac{37(23)}{89} = 9.561797753$$

Must give value too!

5. Show the computation of the Obama's Econ and Respondent's Health box for the test statistic.

Contribution for ObEcon ∩ Resp. Health

$$\frac{(9 - 9.5618)^2}{9.5618} = \underline{0.0330}$$

Must give value too

6. I believe that 55% of the population is concerned with Economy, while 25% is concerned with health care and only 20% is concerned with the Environment.
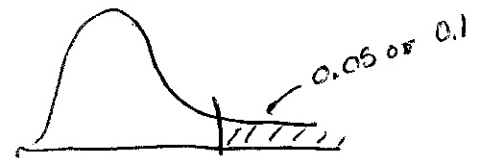
	Economy	Health	Environ	Total
Respondents Concern	41	23	25	89

a) Give the hypotheses for this test.

H_o: $p_{Ec} = 0.55$ $p_H = 0.25$ $p_{En} = 0.20$

H_A: There is at least one difference in the proportions concerned with Econ, Health and Environ.

b) Give the CV

$\chi^2_{2, 0.05} = 5.991$ } Your choice
$\chi^2_{2, 0.1} = 4.605$ } I didn't specify

d) What is the expected value for the number of people concerned with the Economy? Health? Environ?

$E(Econ) = 89(0.55) = 48.95$

$E(Health) = 89(0.25) = 22.25$

$E(Environ) = 89(0.20) = 17.8$

e) Show the computation for the TS

$$\chi^2 = \frac{(41-48.95)^2}{48.95} + \frac{(23-22.25)^2}{22.25} + \frac{(25-17.8)^2}{17.8}$$

$$= 4.228804903$$

f) What is the decision?

Fail to reject H_o

At the 90% c.L there is not enough evidence to support the claim that a respondent's concern is different than 55% for econ, 25% for health and 20% for environ.

g) Is the test in 6) a test of independence, homogeneity or goodness of fit?

Goodness of fit