In-class assignment 12 Name _____
BQM Spring 2016

1. In 2015, according to Statista.com, the market shares of soft drinks were: non-cola soda at 19.7%, bottled water at 19.1%, cola soda at 17.7%, juice at 17.4%, energy drinks at 10%, sports drinks at 6.9%, and other at 9.2%. The following table gives the frequencies for soft drinks in a sample you conducted last week. Are the market shares the same as they were in 2015?

Soft Drink	f	e	$(f-e)^2/e$
non-cola soda	93		
bottled water	102		
cola soda	83		
juice	85		
energy drinks	53		
sports drinks	36		
other	48		

a. State the null and the alternative hypotheses.
b. At $\alpha = .05$, find the critical value(s).
c. Are the assumptions of the test satisfied?
d. Compute the expected frequencies
e. Compute the test statistic.
f. What is the conclusion of the test statistic?

2. A 150 individuals (males and females) were surveyed, and each was asked to indicate their yearly incomes to determine if income depends on gender. The results of the survey are shown below.

Income (in 1000s)	Males	Females	TOTAL
20-40	10	30	
40-60	35	15	
60-80	15	45	
TOTAL			

a. State the null and the alternative hypotheses.
b. At $\alpha = .05$, find the critical value(s).
c. Are the assumptions of the test satisfied?
d. Compute the expected frequencies
e. Compute the test statistic.
f. What is the conclusion of the test statistic?

	Males	Females	TOTAL
20-40			
40-60			
60-80			
TOTAL			

	Males	Females	
20-40			
40-60			Test stat
60-80			

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3. Your firm is a supplier of o-rings to the next generation NASA space vehicle. In order to continue as a supplier, you have to produce 10,000 three-centimeter o-rings per year with a standard deviation less than 0.1 mm at 1% significance. Since the variance test requires the variable to be normally distributed, you need to ensure the o-ring distribution is normally distributed at 1% significance. For this test, the minimum sample size is 40.

a. Compute the sample statistics

***n* = 40** $\bar{x}$ **= 7.01** ***s* = 0.17**

b. With $e_{min} = 5$ required for this test, how many intervals will be needed?

***k* =**

c. What is the probability of being in each of these intervals?

***p* =**

d. What is the expected frequency of being in each interval?

***e* =**

e. Find the z-scores that split the standard normal distribution into *k* equal regions.

Interval	p-value	z-value
1		
2		
3		

f. Complete the table below.

interval	LL	UL	f	e	$(f-e)^2$	$(f-e)^2/e$
1						
2						
3						

g. Compute the test statistic.

h. What are the degrees of freedom for this test?

i. What is the critical value for this test?

j. What is the conclusion of this test?