Individual assignment 2

Please specify the question number clearly in your answers. Fail to do so will result in a deduction of 5 points.

The following questions are related to topics in Chapter 16.

Question 1 (45 points total):

A local car dealer is attempting to determine the effect of different premiums on attracting visitors to its showroom. An individual who visits the showroom and takes a test ride is given a premium with no obligation. The dealer chose five premiums and offered each for one week. The results are as follows:

Week	Premium	Total Given Out
1	Four-foot metal stepladder	430
2	$50 savings bond	600
3	Dinner for four at a local steakhouse	503
4	Six pink flamingos plus an outdoor thermometer	707
5	10% off coupon	599

1(a): Please identify the research question (one sentence) (5 points).

(Here are some examples of the research question:

How/why A is related to B?

Does A cause/equal/bigger/smaller/explain than B?

Whether A is equal/bigger/smaller than B?)

Does the type of premium offered affect the number of visitors to the car showroom? 1(a)

1(b) Please generate the appropriate hypothesis (10 points)

H0:

The type of premium offered does not affect the number of visitors to the car showroom. 1(b)

Ha:

The type of premium offered does affect the number of visitors to the car showroom. 1(b)

1(c): Find the appropriate statistical test, compute the test statistics. (alpha value=.05)

Please provide detailed calculation procedures. (25points)

The appropriate statistical test for this research question is the one-way Analysis of Variance (ANOVA) test, as we are comparing the means of more than two groups (the different types of premiums). 1(c)

1(d): Based on your computed test statistics, draw your conclusions (5 points)

The conclusion will be based on the p-value obtained from the ANOVA test. If the p-value is less than the significance level (0.05), we reject the null hypothesis and conclude that the type of premium offered does affect the number of visitors to the car showroom. If the p-value is greater than the significance level, we fail to reject the null hypothesis and conclude that the type of premium offered does not affect the number of visitors to the car showroom.

Step 1: Calculate the mean for each group.

The mean for the group with the "Four-foot metal stepladder" premium is 430.

The mean for the group with the "$50 savings bond" premium is 600.

The mean for the group with the "Dinner for four at a local steakhouse" premium is 503.

The mean for the group with the "Six pink flamingos plus an outdoor thermometer" premium is 707.

The mean for the group with the "10% off coupon" premium is 599.

Step 2: Calculate the overall mean (the mean of all the individuals regardless of the group).

The overall mean is

1656559/2839.

Step 3: Calculate the "between-group" sum of squares and the "within-group" sum of squares.

The "between-group" sum of squares is 69504209910/2839

Step 4: Calculate the "between-group" degrees of freedom and the "within-group" degrees of freedom.

The "between-group" degrees of freedom is 4.

The "within-group" degrees of freedom is 2834.

Step 5: Calculate the "between-group" mean square and the "within-group" mean square.

The "between-group" mean square is 34752104955/5678.

The "within-group" mean square is 0.

Since the "within-group" mean square is 0, the F statistic is undefined. However, in practice, a "within-group" mean square of 0 indicates that there is no variability within groups, and thus the F statistic would be considered infinitely large. This would lead us to reject the null hypothesis.

Finally, we would compare the F statistic to the F-distribution with the appropriate degrees of freedom to obtain a p-value. However, since the F statistic is infinitely large, the p-value would be effectively 0, leading us to reject the null hypothesis.

Therefore, we reject the null hypothesis and conclude that the type of premium offered does affect the number of visitors to the car showroom. 1(d)

2. What conclusion(s) can you make from the following cross tabulation? (5 points)

(Note: This is a multiple-choice question with single answer. You can simply put the option and don't need to elaborate your answer)

	Number of Children		
Ever Divorced	1 or less	2 to 4	5 or more
Yes	9%	63%	92%
No	91%	37%	8%
Total	100%	100%	100%

a. Having more children increases the divorce rate.

b. Getting divorced makes a couple have more children.

c. The more children a person has the more likely s/he is to be divorced. 2

d. All of the above can be correctly concluded from the cross-tabulation.

e. None of the above can be concluded from the cross-tabulation.