Multiple Choice questions – 40 points

1) From the list below, pick the item which is *not* characteristic of a missing data process.
   A. Data entry errors.
   B. Data collection errors.
   C. Badly designed research questions.
   D. Respondent's refusal to complete an entire questionnaire.

2) Which missing data imputation technique is implemented by SPSS if the PAIRWISE option is specified?
   A. Complete data
   B. All Available data
   C. Case substitution
   D. Mean substitution

3) What is not a possible cause of outliers?
   A. Procedural errors
   B. Extraordinary events
   C. An unrepresentative sample
   D. An ordinary value which is unique when combined with other variables

4) What is a potential remedy for heteroscedasticity?
   A. Transform one or more variables
   B. Use the forward method
   C. Use the backward method
   D. Exclude dummy variables

5) When we see a distinct S-shaped curve in the normal probability plot, what kind of distribution are we looking at?
   A. A uniform distribution.
   B. A peaked distribution.
   C. A non-peaked distribution.
   D. A normal distribution.

6) The coefficient of determination is used:
   A. To assess the relationship between the dependent and the independent variables.
   B. As a guide to the relative importance of the predictor variables.
   C. As a prediction in estimating the size of the confidence interval.
   D. To test the different coefficients of each independent variable.

7) Are these statements true or false?
   1) A measure of predictive accuracy is the standard error of the estimate.
   2) The coefficient of determination is the squared correlation of predicted values.
   A. Statement 1 and statement 2 are true.
   B. Statement 1 and statement 2 are false.
   C. Statement 1 is true and statement 2 is false.
   D. Statement 1 is false and statement 2 is true.

8) What is a moderator effect?
   A. Effect in which an independent-dependent variable relationship is affected by another independent variable.
   B. Effect in which a third independent variable causes the other independent variables to change.
   C. Effect in which an independent-dependent variable relationship is affected by a change in the dependent variable.
   D. Effect in which a change in an independent variable causes the dependent variable to change.

9) What is the *null plot* and does it show a violation of the Multivariate Regression Analysis (MRA) assumptions for the variate?
   A. It is a plot between the dependent variable and an independent variable; it shows a violation of the MRA assumptions.
   B. It is a plot of the residuals versus the predicted dependent variable; it does not show a violation of the MRA assumptions.
   C. It is a plot between the dependent variable and an independent variable; it does not show a violation of the MRA assumptions.
   D. It is a plot of the residuals versus the predicted dependent variable; it shows a violation of the MRA assumptions.

10) An outlier may be deleted from the data when:
   A. The outlier is an error in observation or data entry
   B. The outlier is an exceptional observation with no likely explanation
   C. The outlier is exceptional in its combination of characteristics
   D. None of the above

11) Which of the following options is *not* a remedy for multicollinearity?
   A. Omit one or more highly correlated independent variables
   B. Apply Principal Component analysis before the regression
   C. Delete outliers from the dataset
   D. Use the model for prediction only

12) Multicollinearity has a negative effect on the regression because:
   A. It increases the R-square(R^2) of the regression
   B. The dependent variable cannot be explained by the independent variables
   C. We are not allowed to use dummy variables
   D. The significance level of the regression coefficients becomes lower

13) The standard error is
   A. Equal to the sampling error
   B. An indicator of the presence of heteroscedasticity
   C. Determines the practical significance of a regression model
   D. The expected variation of the estimated coefficients

14) The adjusted R^2 is used instead of R^2 when:
   A. The regular R^2 is not significant
   B. Singularity is present in the dataset
   C. We want to compare independent variables
   D. We want to compare regression models

15) When the variance of the error terms appears constant over a range of x values the data are said to be:
   A. Heteroscedastic
   B. Homoscedastic
   C. Linear
   D. Standardized

16) What is a factor loading?
   A. A composite measure created for each observation on each factor extracted in the factor analysis.
   B. The correlation between an original variable and a factor.
   C. The column sum of squared loadings for a factor.
   D. The degree of correspondence between the items selected to constitute a summated scale.

17) Which of the following statements is false?
   A. Factor indeterminacy means that for any individual respondent several different factor scores can be calculated from a single factor model result
   B. In a scree test, latent roots are plotted against the number of factors in their order of extraction
   C. The Bartlett test of sphericity tests whether all variables are uncorrelated
   D. Component analysis considers the total variance and derives factors that contain small proportions of unique variance

18) Which of the following concepts does *not* have to be met for summated scales to be valid?
   A. Content validity
   B. Face validity
   C. Multidimensionality
   D. Reliability

19) Using a data set of 400 observations, we obtain this component matrix. How many cross-loadings are there?

Component Matrix

	Component		
	1	2	3
Var1	,798	,099	,097
Var2	,785	,052	,017
Var3	,597	,377	,026
Var4	,606	,130	,257
Var5	,202	,510	,591
Var6	,095	,024	,904
Var7	,125	,814	-,019
Var8	,149	,771	,207

   A. 1
   B. 2
   C. 8
   D. From this component matrix we cannot make any statements about the number of cross-loadings.

20) Given this Component correlation matrix for correlations between the components, which statement is true?

Component Correlation Matrix

Component	1	2	3
1	1,000	,341	,237
2	,341	1,000	,233
3	,237	,233	1,000

A. An oblique rotation is used.
B. An orthogonal rotation is used.
C. This matrix provides no information whether an orthogonal or an oblique rotation is used
D. All of the above are true.

Scenario 1 – 30 points

A retail company wants to increase their sales. Therefore, they hire you- an expert in Multivariate Regression Analysis- to study important characteristics that can influence the amount of purchases customers make from their company. For the study, data was collected for 100 respondents on 5 separate variables. These variables are listed below:

X22 - Purchase Level
X2 - Industry Type
X10 - Advertising
X11 - Product Line
X13 - Competitive Pricing

Details of the variables are:
X22 is measured as the percentage of purchases from the company
X2 is a dummy variable indicating the type of industry that purchases the company's products (0=magazine industry; 1=newsprint industry)
Each separate variable X10, X11, and X13 represents the perception of the retail company's performance for this specific attribute, which are considered to be most influential for the selection choices of the customers. Respondents could rate each of the 3 attributes on 0-10 scale with 10 being "Excellent" and 0 being "Poor".

Questions
Appendix A contains the SPSS output required for answering the questions of Scenario 1. When answering these questions, always explicitly mention the table, matrix or graph you used to provide the answer. When test results need to be provided, specify the complete test with correct hypotheses, test values, significance levels, and what you conclude from the test results (interpretation). If no significance level is provided, be sure to specify the level you will use. *Note that not mentioning these details means fewer points!*

Question 1:

Explain if Multivariate Regression Analysis is allowed for the given dataset.

Question 2:

Are there any problems with missing data and outliers? Explain your answer.

Question 3:

Discuss the assumption of normality in this data set. Use a significance level of $\alpha=0.05$.

Question 4:

Test for the presence of heteroscedasticity for the variables Advertising, Product Line and Competitive Pricing. On the basis of a test on the means of the variables, what do you conclude?

Questions 5-9 are based on Multivariate Regression Analysis 1.

Question 5:

Provide the regression equation for the regression model using the *enter method.*

Question 6:

Determine the percentage of variation in the dependent variable that is explained by the regression model. Specify the test used, the hypothesis tested, and whether this percentage is significant.

Question 7:

Explain which independent variables have a significant contribution in the prediction of the dependent variable in the regression model. Use a 5% significance level for your test.

Question 8:

Indicate and explain which independent variable has the highest influence on the dependent variable of the regression equation.

Question 9:

Explain the difference between zero- order correlation and partial correlation.

Questions 10-11 are based on Multivariate Regression Analysis 2.

Question 10:

Provide the regression equation for the regression model.

Question 11:

How would you interpret the influence of the dummy variable?

Question 12

Explain which model you would select for predicting the dependent variable X_{22}. (Use the results from Multivariate Regression Analysis 1 and 2 presented in Appendix A). Indicate exactly which model you would select.

Scenario 2 – 30 points

An important tool for many retail firms is training of its sales force, for which several different techniques are available. In order to gain more insight into the effectiveness of certain types of training techniques, a sales manager wishes to reduce the data he has to be used in further multivariate analysis.

The sales training data were collected via a mail questionnaire which was sent to 80 sales training managers at various firms throughout the United States. The questionnaire addresses the usage of various training methods by the respondent's firm. There are 9 methods in total. The respondent rates all methods on a five-point scale for present frequency, that is, for how often each technique is being used at present. The variables are listed below:

A1 'CONF/DISCUSSION-PRESENT'
A2 'LECTURE METHOD-PRESENT'
A3 'CASE STUDY-PRESENT'
A4 'TV-LECTURE-PRESENT'
A5 'FILM VIEWING-PRESENT'
A6 'VIDEO TAPE/DISC-PRESENT'
A7 'INTERACTIVE VIDEO-PRESENT'
A8 'ROLE PLAY:VIDEO TAPE-PRESENT'
A9 'BUSINESS GAMES-PRESENT'

Questions
You have to answer a couple of questions. For some of the questions, you have to check the SPSS output given in Appendix B. When answering to these questions, always mention explicitly which table, matrix or graph you used to provide the answer (not mentioning this means fewer points!).

Question 1:

a) What is factor analysis and what is the goal of factor analysis?
b) What are the two main factor analysis models? Briefly describe each method and their differences.
c) What is the difference between R-type and Q-type factor analysis?

Question 2:

a) Is factor analysis allowed on this dataset? Motivate your answer.
b) Intercorrelation is an important statistical assumption that has to be met for factor analysis. Describe three possible measures to test this assumption.
c) Based on the SPSS output in Appendix B, do the data in factor analysis 1 meet the required assumptions? If not, what remedy would you propose?

Question 3:

a) Give three different criteria to determine how many factors should be extracted.
b) Based on the SPSS output in Appendix B for factor analysis 2, how many factors should be extracted and based on what criterion?
c) After obtaining the factor solution, the researcher has to evaluate the factor solution. In which three cases is respecification of the model needed?
d) Does the unrotated factor solution in factor analysis 2 provide a good factor solution? Motivate your answer .

Question 4:

a) What is factor rotation? Use the SPSS output in factor analysis 3 to explain the concept.

Question 5:

a) Consider the SPSS output in Appendix B for factor analysis 3. Does the orthogonal factor rotation solution provide a good factor solution? Motivate your answer.
b) Does the oblique factor rotation give a satisfactory solution? Motivate your answer.
c) Based on the SPSS output and the goal of the researcher, which factor solution would be preferred in this case?
d) If no satisfactory solutions are found, what remedies would suggest? Name at least two.

Appendix A: Scenario 1 – Multivariate Regression Analysis

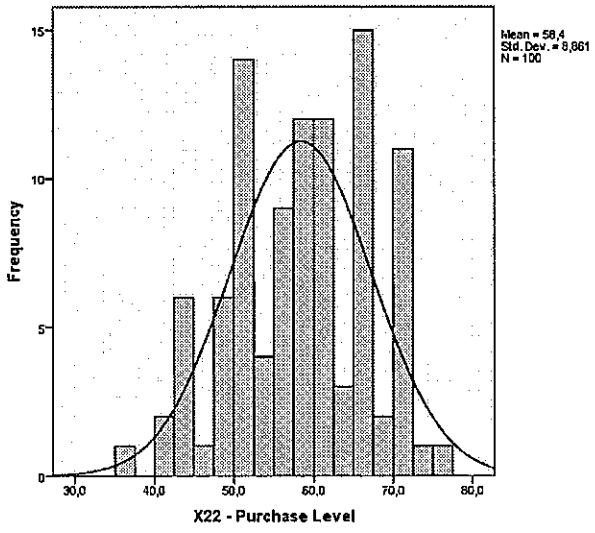
Descriptive Statistics

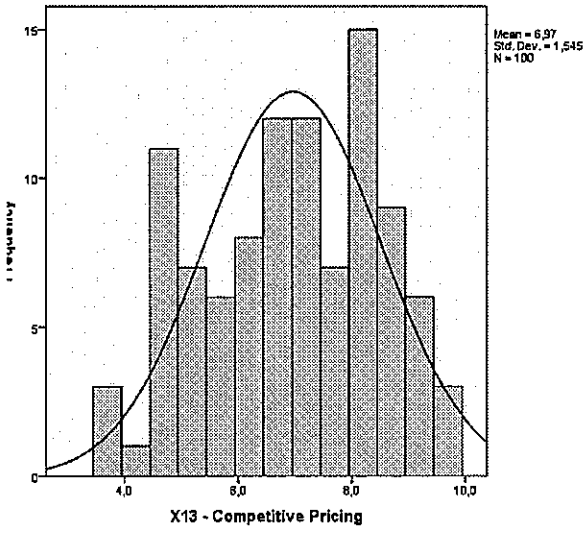
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
X22 - Purchase Level	100	37,1	77,1	58,400	8,8609	-,132	,241	-,684	,478
X13 - Competitive Pricing	100	3,7	9,9	6,974	1,5451	-,240	,241	-,903	,478
X10 - Advertising	100	1,9	6,5	4,010	1,1269	,044	,241	-,888	,478
X11 - Product Line	100	2,3	8,4	5,805	1,3153	-,092	,241	-,522	,478
Valid N (listwise)	100								

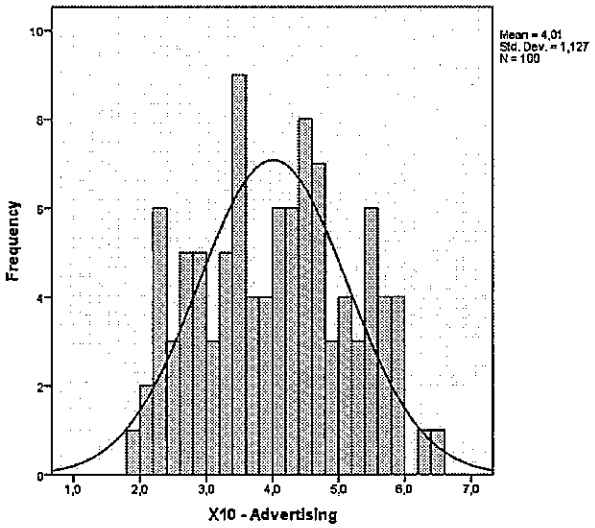
Univariate Statistics

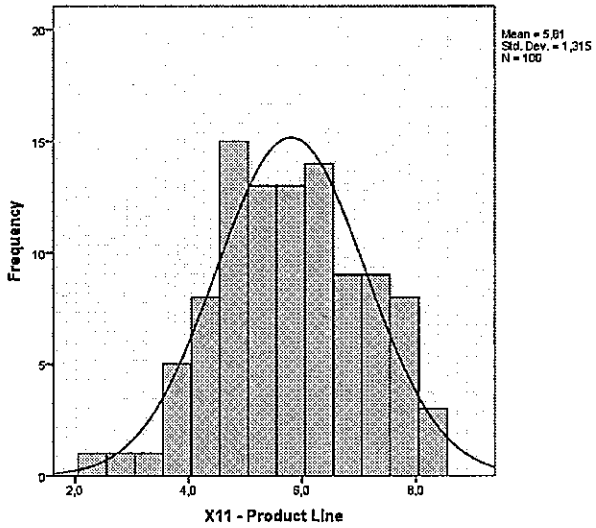
	N	Mean	Std. Deviation	Missing		No. of Extremes[a]	
				Count	Percent	Low	High
x22	100	58,400	8,8609	0	,0	0	0
x10	100	4,010	1,1269	0	,0	0	0
x11	100	5,805	1,3153	0	,0	0	0
x13	100	6,974	1,5451	0	,0	0	0

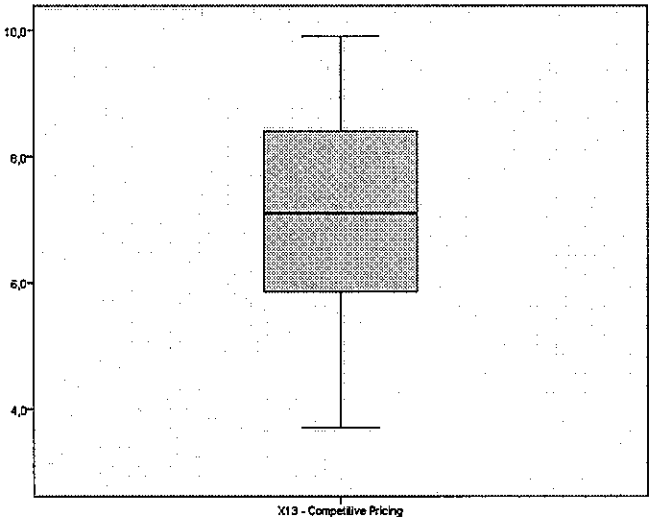
a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

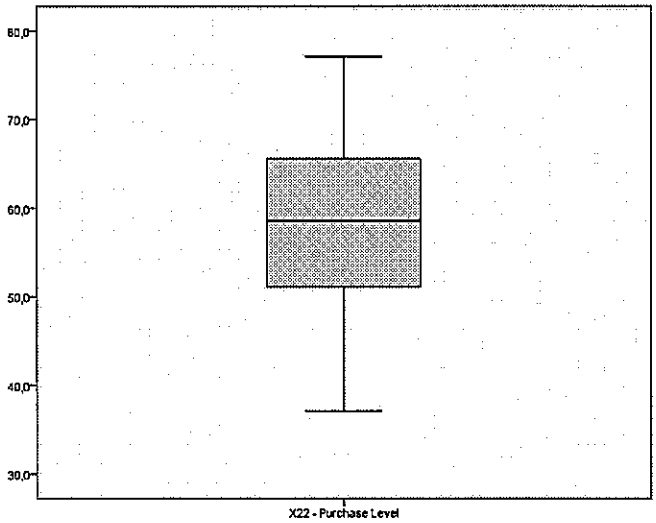


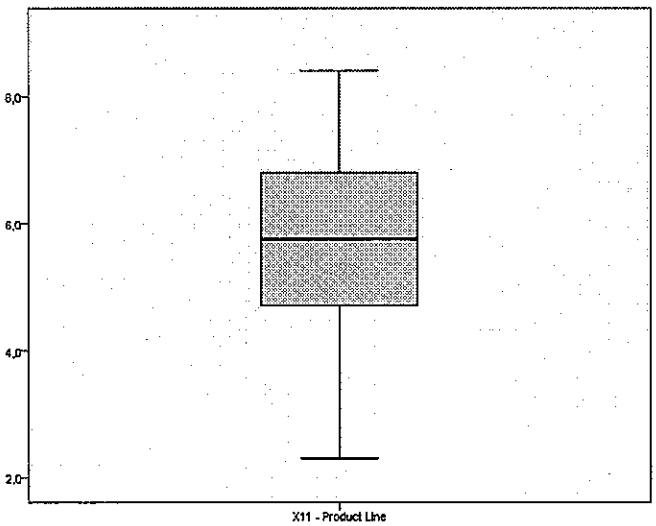


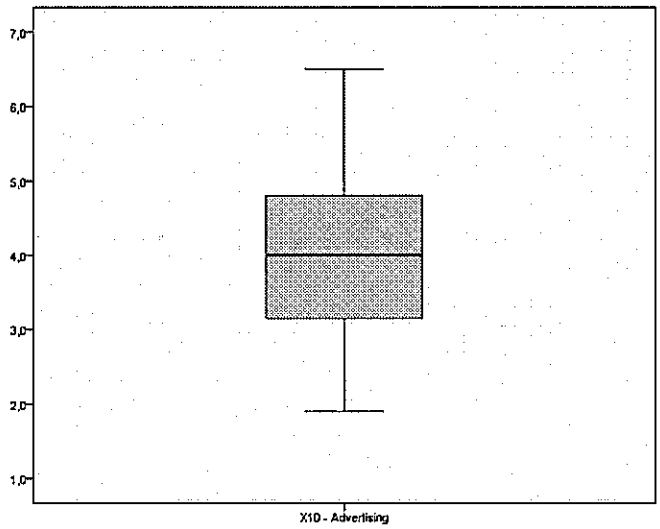

Mean = 4,01
Std. Dev. = 1,127
N = 100
Frequency
X10 - Advertising

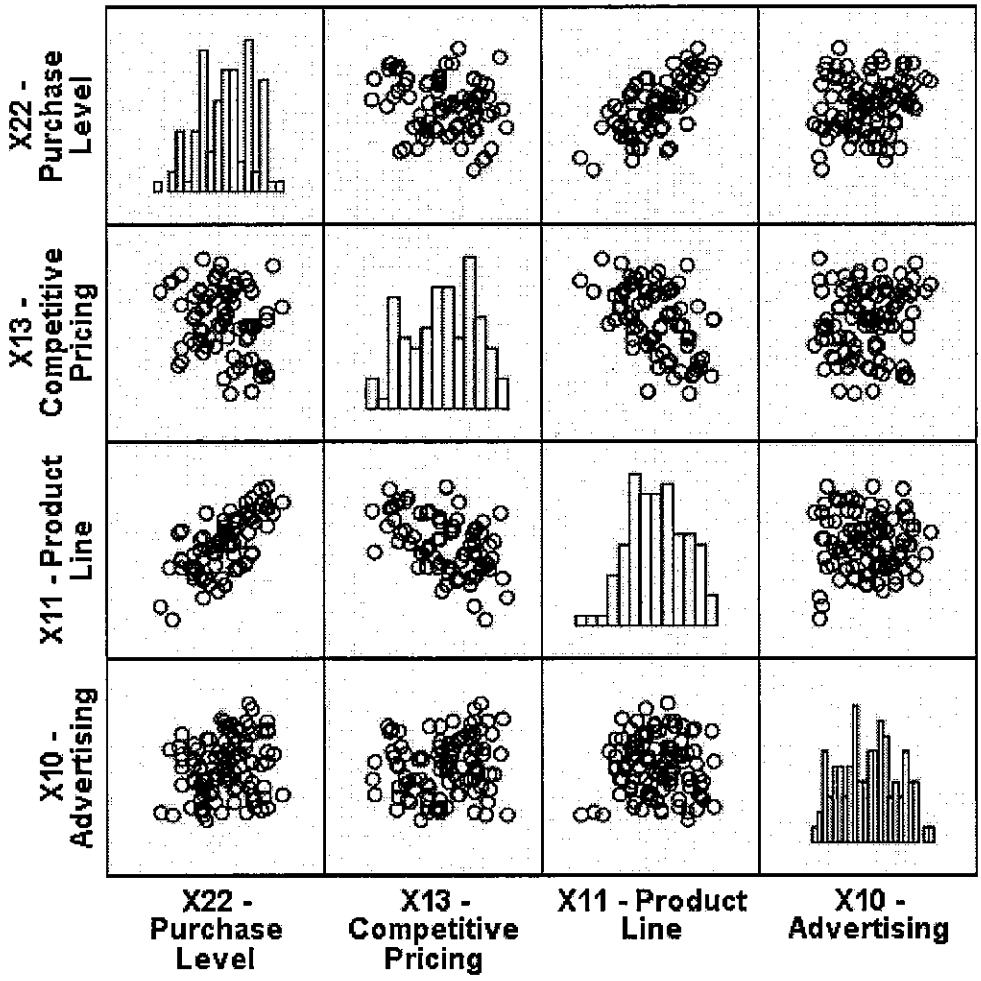

Mean = 5,81
Std. Dev. = 1,315
N = 100
Frequency
X11 - Product Line


X13 - Competitive Pricing


X22 - Purchase Level


X11 - Product Line


X10 - Advertising



Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
X10 - Advertising	,065	100	,200*	,976	100	,068
X11 - Product Line	,060	100	,200*	,987	100	,432
X13 - Competitive Pricing	,106	100	,007	,968	100	,014
X22 - Purchase Level	,075	100	,180	,983	100	,208

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
X10 - Advertising	Based on Mean	1,279	1	98	0,261
	Based on Median	1,273	1	98	0,262
	Based on Median and with adjusted df	1,273	1	97,784	0,262
	Based on trimmed mean	1,279	1	98	0,261
X11 - Product Line	Based on Mean	0,047	1	98	0,828
	Based on Median	0,048	1	98	0,826
	Based on Median and with adjusted df	0,048	1	97,543	0,826
	Based on trimmed mean	0,045	1	98	0,833
X13 - Competitive Pricing	Based on Mean	4,928	1	98	0,029
	Based on Median	4,085	1	98	0,046
	Based on Median and with adjusted df	4,085	1	94,62	0,046
	Based on trimmed mean	4,832	1	98	0,03

Multivariate Regression Analysis 1

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	X13 - Competitive Pricing, X10 - Advertising, X11 - Product Line[b]	.	Enter

a. Dependent Variable: X22 - Purchase Level

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,675[a]	,455	,438	6,6423

a. Predictors: (Constant), X13 - Competitive Pricing, X10 - Advertising, X11 - Product Line

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3537,449	3	1179,150	26,726	,000[b]
	Residual	4235,551	96	44,120		
	Total	7773,000	99			

a. Dependent Variable: X22 - Purchase Level

b. Predictors: (Constant), X13 - Competitive Pricing, X10 - Advertising, X11 - Product Line

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	22,763	6,195		3,674	,000			
	X10 - Advertising	1,398	,599	,178	2,334	,022	,181	,232	,176
	X11 - Product Line	4,621	,585	,686	7,895	,000	,644	,627	,595
	X13 - Competitive Pricing	,460	,503	,080	,914	,363	-,235	,093	,069

a. Dependent Variable: X22 - Purchase Level

Multivariate Regression Analysis 2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	X2 - Industry Type, X10 - Advertising, X11 - Product Line, X13 - Competitive Pricing[b]	.	Enter

a. Dependent Variable: X22 - Purchase Level

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,696[a]	,485	,463	6,4932

a. Predictors: (Constant), X2 - Industry Type, X10 - Advertising, X11 - Product Line, X13 - Competitive Pricing

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3767,637	4	941,909	22,340	,000[b]
	Residual	4005,363	95	42,162		
	Total	7773,000	99			

a. Dependent Variable: X22 - Purchase Level

b. Predictors: (Constant), X2 - Industry Type, X10 - Advertising, X11 - Product Line, X13 - Competitive Pricing

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	23,644	6,068		3,896	,000			
	X10 - Advertising	1,382	,586	,176	2,360	,020	,181	,235	,174
	X11 - Product Line	4,582	,572	,680	8,005	,000	,644	,635	,590
	X13 - Competitive Pricing	,586	,494	,102	1,185	,239	-,235	,121	,087
	X2 - Industry Type	-3,069	1,314	-,174	-2,337	,022	-,223	-,233	-,172

Appendix B: Scenario 2 – Factor Analysis

Factor analysis 1 – Question 2

Anti-image Matrices

		CONF/DISCUSSION-PRESENT	LECTURE METHOD-PRESENT	CASE STUDY-PRESENT	TV-LECTURE-PRESENT	FILM VIEWING-PRESENT	VIDEO TAPE/DISC-PRESENT	INTERACTIVE VIDEO-PRESENT	ROLE PLAY: VIDEO TAPE-PRESENT	BUSINESS GAMES-PRESENT
Anti-image Covariance	CONF/DISCUSSION-PRESENT	.676	-.106	-.130	.021	-.163	-.181	-.082	.001	-.182
	LECTURE METHOD-PRESENT	-.106	.836	-.038	-.071	.000	-.155	.232	-.143	.051
	CASE STUDY-PRESENT	-.130	-.038	.742	-.095	-.127	.033	-.117	-.118	-.117
	TV-LECTURE-PRESENT	.021	-.071	-.095	.840	-.124	-.136	-.055	.109	-.141
	FILM VIEWING-PRESENT	-.163	.000	-.127	-.124	.802	-.027	.125	-.072	-.032
	VIDEO TAPE/DISC-PRESENT	-.181	-.155	.033	-.136	-.027	.808	-.136	.061	.041
	INTERACTIVE VIDEO-PRESENT	-.082	.232	-.117	-.055	.125	-.136	.743	-.267	.056
	ROLE PLAY:VIDEO TAPE-PRESENT	.001	-.143	-.118	.109	-.072	.061	-.267	.797	-.051
	BUSINESS GAMES-PRESENT	-.182	.051	-.117	-.141	-.032	.041	.056	-.051	.816
Anti-image Correlation	CONF/DISCUSSION-PRESENT	.719[a]	-.142	-.184	.028	-.222	-.245	-.116	.001	-.246
	LECTURE METHOD-PRESENT	-.142	.501[a]	-.048	-.085	.000	-.189	.294	-.175	.062
	CASE STUDY-PRESENT	-.184	-.048	.769[a]	-.120	-.164	.043	-.158	-.153	-.150
	TV-LECTURE-PRESENT	.028	-.085	-.120	.692[a]	-.151	-.165	-.069	.133	-.170
	FILM VIEWING-PRESENT	-.222	.000	-.164	-.151	.726[a]	-.034	.162	-.089	-.040
	VIDEO TAPE/DISC-PRESENT	-.245	-.189	.043	-.165	-.034	.637[a]	-.175	.076	.051
	INTERACTIVE VIDEO-PRESENT	-.116	.294	-.158	-.069	.162	-.175	.458[a]	-.347	.072
	ROLE PLAY:VIDEO TAPE-PRESENT	.001	-.175	-.153	.133	-.089	.076	-.347	.544[a]	-.064
	BUSINESS GAMES-PRESENT	-.246	.062	-.150	-.170	-.040	.051	.072	-.064	.716[a]

a. Measures of Sampling Adequacy(MSA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.650
Bartlett's Test of Sphericity	Approx. Chi-Square	91.686
	df	36
	Sig.	.000

Communalities

	Initial	Extraction
CONF/DISCUSSION-PRESENT	1.000	.543
LECTURE METHOD-PRESENT	1.000	.556
CASE STUDY-PRESENT	1.000	.540
TV-LECTURE-PRESENT	1.000	.342
FILM VIEWING-PRESENT	1.000	.456
VIDEO TAPE/DISC-PRESENT	1.000	.640
INTERACTIVE VIDEO-PRESENT	1.000	.718
ROLE PLAY:VIDEO TAPE-PRESENT	1.000	.528
BUSINESS GAMES-PRESENT	1.000	.563

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.454	27.268	27.268	2.454	27.268	27.268
2	1.382	15.360	42.627	1.382	15.360	42.627
3	1.050	11.665	54.292	1.050	11.665	54.292
4	.995	11.056	65.348			
5	.775	8.612	73.960			
6	.768	8.538	82.498			
7	.629	6.984	89.482			
8	.511	5.680	95.161			
9	.435	4.839	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
CONF/DISCUSSION-PRESENT	.732	-.067	.051
LECTURE METHOD-PRESENT	.338	-.466	.474
CASE STUDY-PRESENT	.669	.219	-.213
TV-LECTURE-PRESENT	.498	-.290	-.100
FILM VIEWING-PRESENT	.571	-.248	-.261
VIDEO TAPE/DISC-PRESENT	.490	-.179	.607
INTERACTIVE VIDEO-PRESENT	.311	.758	.218
ROLE PLAY:VIDEO TAPE-PRESENT	.383	.598	.153
BUSINESS GAMES-PRESENT	.547	-.057	-.510

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Factor analysis 2 – Question 3

Anti-image Matrices

		CONF/DISCUSSION-PRESENT	LECTURE METHOD-PRESENT	CASE STUDY-PRESENT	TV-LECTURE-PRESENT	FILM VIEWING-PRESENT	VIDEO TAPE/DISC-PRESENT	ROLE PLAY: VIDEO TAPE-PRESENT	BUSINESS GAMES-PRESENT
Anti-image Covariance	CONF/DISCUSSION-PRESENT	.685	-.090	-.149	.015	-.155	-.205	-.033	-.180
	LECTURE METHOD-PRESENT	-.090	.916	-.001	-.060	-.044	-.127	-.074	.037
	CASE STUDY-PRESENT	-.149	-.001	.761	-.107	-.113	.013	-.187	-.111
	TV-LECTURE-PRESENT	.015	-.060	-.107	.844	-.119	-.151	.102	-.138
	FILM VIEWING-PRESENT	-.155	-.044	-.113	-.119	.823	-.005	-.031	-.043
	VIDEO TAPE/DISC-PRESENT	-.205	-.127	.013	-.151	-.005	.834	.014	.053
	ROLE PLAY:VIDEO TAPE-PRESENT	-.033	-.074	-.187	.102	-.031	.014	.907	-.036
	BUSINESS GAMES-PRESENT	-.180	.037	-.111	-.138	-.043	.053	-.036	.821
Anti-image Correlation	CONF/DISCUSSION-PRESENT	.715[a]	-.113	-.206	.020	-.207	-.271	-.042	-.240
	LECTURE METHOD-PRESENT	-.113	.757[a]	-.002	-.068	-.050	-.146	-.081	.042
	CASE STUDY-PRESENT	-.206	-.002	.748[a]	-.133	-.142	.016	-.225	-.141
	TV-LECTURE-PRESENT	.020	-.068	-.133	.702[a]	-.142	-.180	.116	-.166
	FILM VIEWING-PRESENT	-.207	-.050	-.142	-.142	.799[a]	-.006	-.036	-.053
	VIDEO TAPE/DISC-PRESENT	-.271	-.146	.016	-.180	-.006	.665[a]	.017	.064
	ROLE PLAY:VIDEO TAPE-PRESENT	-.042	-.081	-.225	.116	-.036	.017	.637[a]	-.041
	BUSINESS GAMES-PRESENT	-.240	.042	-.141	-.166	-.053	.064	-.041	.738[a]

a. Measures of Sampling Adequacy(MSA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.725
Bartlett's Test of Sphericity	Approx. Chi-Square	69.699
	df	28
	Sig.	.000

Communalities

	Initial	Extraction
CONF/DISCUSSION-PRESENT	1.000	.541
LECTURE METHOD-PRESENT	1.000	.632
CASE STUDY-PRESENT	1.000	.563
TV-LECTURE-PRESENT	1.000	.555
FILM VIEWING-PRESENT	1.000	.385
VIDEO TAPE/DISC-PRESENT	1.000	.599
ROLE PLAY:VIDEO TAPE-PRESENT	1.000	.751
BUSINESS GAMES-PRESENT	1.000	.545

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.399	29.991	29.991	2.399	29.991	29.991
2	1.142	14.276	44.267	1.142	14.276	44.267
3	1.031	12.882	57.149	1.031	12.882	57.149
4	.788	9.856	67.004			
5	.769	9.617	76.622			
6	.749	9.367	85.989			
7	.629	7.857	93.845			
8	.492	6.155	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component		
	1	2	3
CONF/DISCUSSION-PRESENT	.734	.021	.050
LECTURE METHOD-PRESENT	.390	.356	.594
CASE STUDY-PRESENT	.649	-.373	-.041
TV-LECTURE-PRESENT	.514	.355	-.406
FILM VIEWING-PRESENT	.604	-.050	-.131
VIDEO TAPE/DISC-PRESENT	.486	.558	.228
ROLE PLAY:VIDEO TAPE-PRESENT	.326	-.615	.517
BUSINESS GAMES-PRESENT	.562	-.241	-.415

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Factor Analysis 3 – Questions 4 and 5

Communalities

	Initial	Extraction
CONF/DISCUSSION-PRESENT	1.000	.541
LECTURE METHOD-PRESENT	1.000	.632
CASE STUDY-PRESENT	1.000	.563
TV-LECTURE-PRESENT	1.000	.555
FILM VIEWING-PRESENT	1.000	.385
VIDEO TAPE/DISC-PRESENT	1.000	.599
ROLE PLAY:VIDEO TAPE-PRESENT	1.000	.751
BUSINESS GAMES-PRESENT	1.000	.545

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.399	29.991	29.991	2.399	29.991	29.991	2.058	25.726	25.726
2	1.142	14.276	44.267	1.142	14.276	44.267	1.399	17.483	43.209
3	1.031	12.882	57.149	1.031	12.882	57.149	1.115	13.940	57.149
4	.788	9.856	67.004						
5	.769	9.617	76.622						
6	.749	9.367	85.989						
7	.629	7.857	93.845						
8	.492	6.155	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

	Component		
	1	2	3
CONF/DISCUSSION-PRESENT	.607	.400	.116
LECTURE METHOD-PRESENT	-.012	.773	.186
CASE STUDY-PRESENT	.670	.054	.334
TV-LECTURE-PRESENT	.537	.231	-.462
FILM VIEWING-PRESENT	.592	.183	.030
VIDEO TAPE/DISC-PRESENT	.183	.727	-.193
ROLE PLAY:VIDEO TAPE-PRESENT	.202	.079	.839
BUSINESS GAMES-PRESENT	.727	-.129	-.024

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Pattern Matrix[a]

	Component		
	1	2	3
CONF/DISCUSSION-PRESENT	.574	-.081	.335
LECTURE METHOD-PRESENT	-.103	-.173	.796
CASE STUDY-PRESENT	.685	-.301	-.020
TV-LECTURE-PRESENT	.512	.491	.155
FILM VIEWING-PRESENT	.584	.001	.113
VIDEO TAPE/DISC-PRESENT	.095	.214	.714
ROLE PLAY:VIDEO TAPE-PRESENT	.214	-.827	.079
BUSINESS GAMES-PRESENT	.758	.056	-.225

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Structure Matrix

	Component		
	1	2	3
CONF/DISCUSSION-PRESENT	.656	-.089	.471
LECTURE METHOD-PRESENT	.091	-.163	.770
CASE STUDY-PRESENT	.687	-.316	.140
TV-LECTURE-PRESENT	.538	.482	.282
FILM VIEWING-PRESENT	.611	-.010	.252
VIDEO TAPE/DISC-PRESENT	.261	.219	.739
ROLE PLAY:VIDEO TAPE-PRESENT	.251	-.831	.122
BUSINESS GAMES-PRESENT	.703	.037	-.043

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Component Correlation Matrix

Component	1	2	3
1	1.000	-.021	.239
2	-.021	1.000	.010
3	.239	.010	1.000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.