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# MGN909-DATA ANALYSIS USING SPSS

CA-4

Submitted To:

**Mandeep Bhardwaj**

**CA-4**

Submitted By:

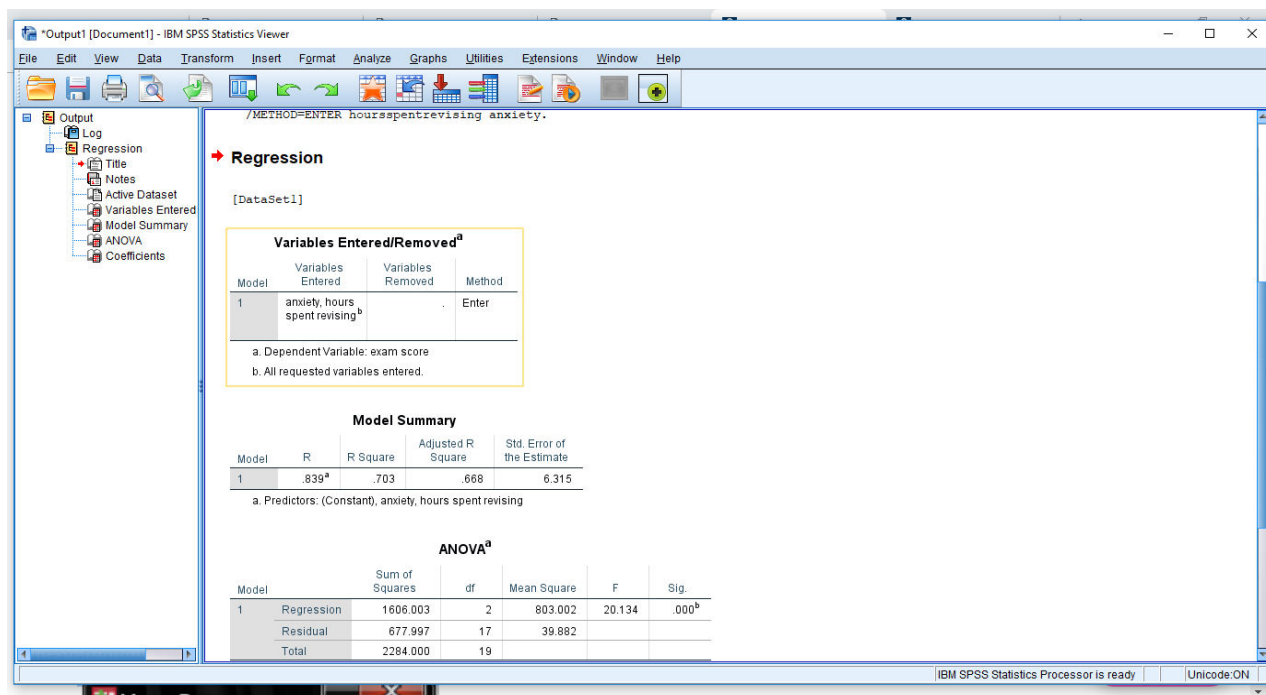
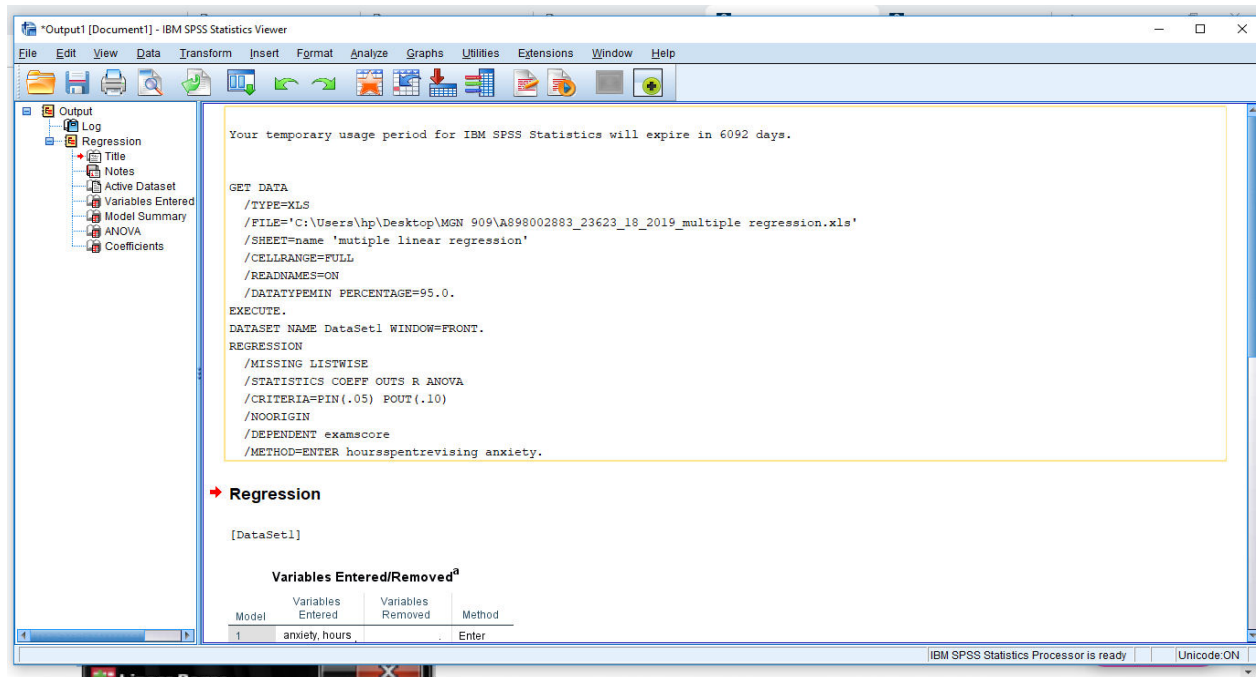
**G Ravi Kanth**

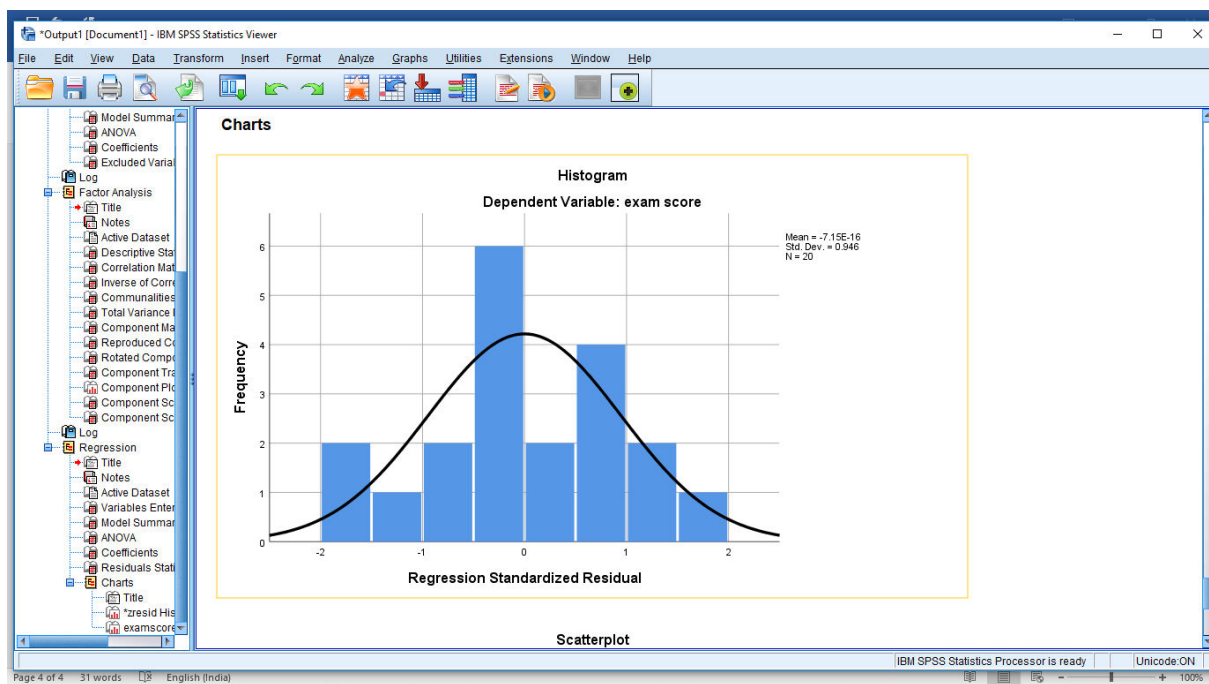
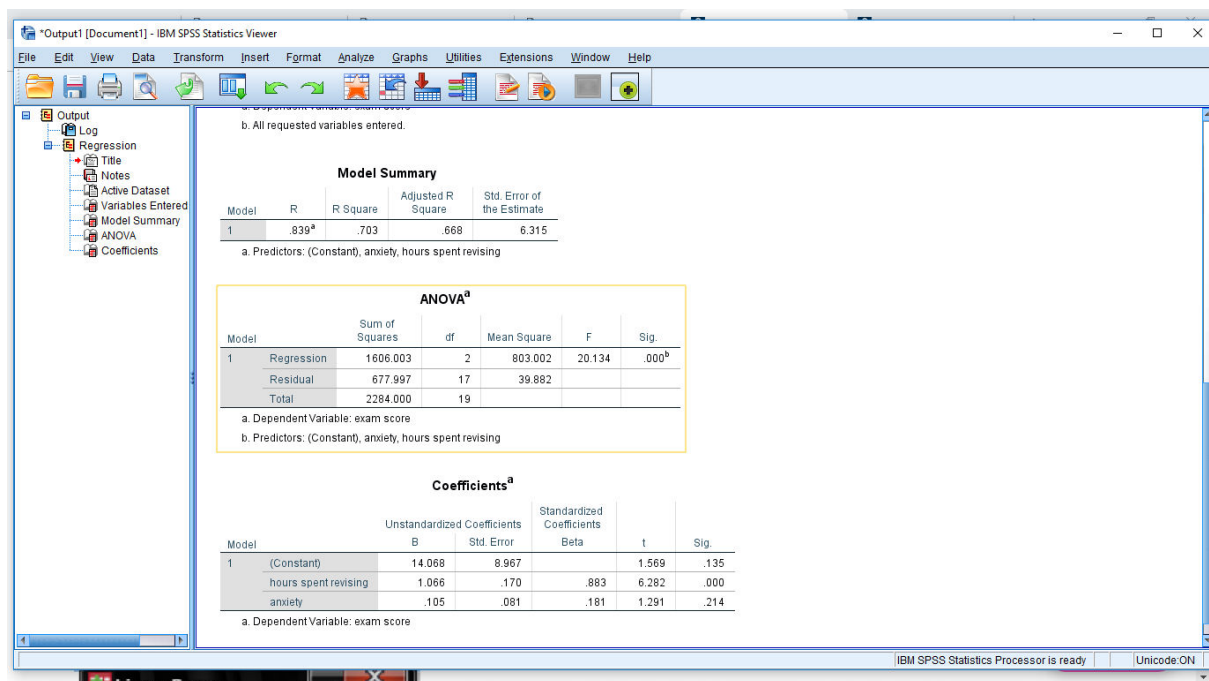
**11616140**

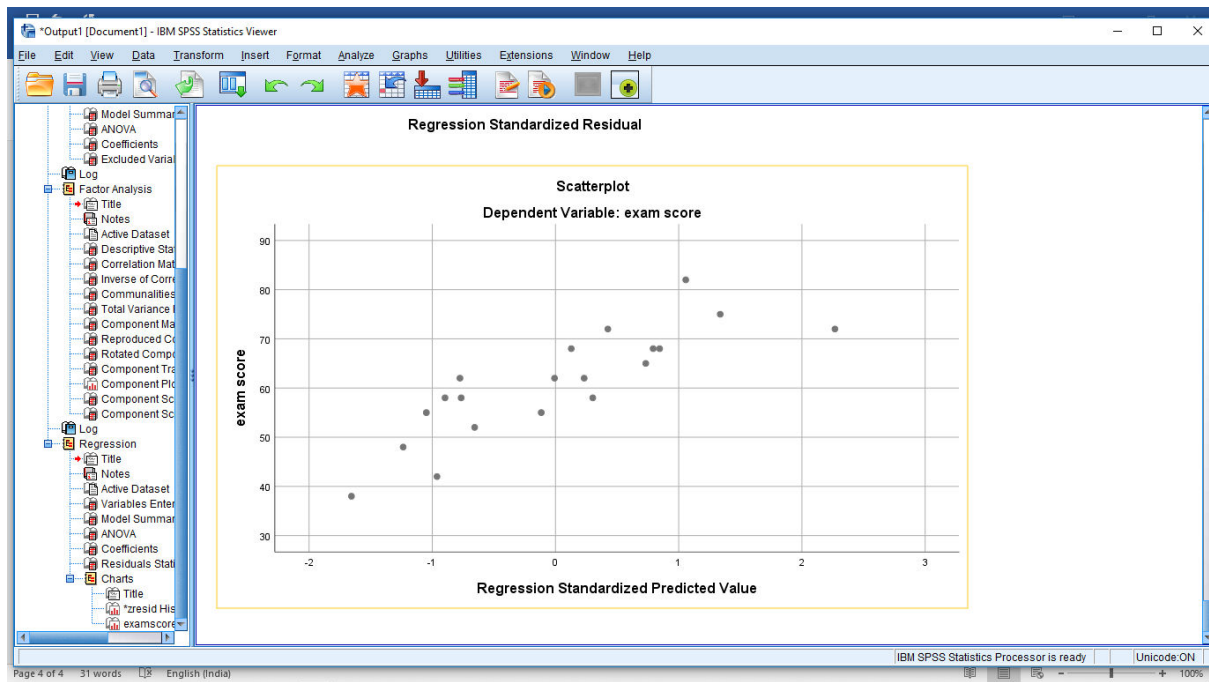
**KOE12-A10**

- 1) Using First sheet do multiple linear regression and interpret the result of the problem.

Ans:)







- The scatterplot shows that there is relation ship between the exam score and standardized predicted value.
- The R Square value is equal to 0.703 it means we can use it for further use but its 70% correctly.
- The coefficient for hours spent revising is 1.066 and anxiety is 0.105
- It shows that anxiety will not effect the score mostly.

## 2) Using Factor Analysis, make appropriate factors and do the regression analysis.

Ans:)

The screenshot shows the IBM SPSS Statistics Viewer interface. The left sidebar displays a tree view with the following structure:

- Log
  - Regression
    - Title
    - Notes
    - Active Dataset
    - Variables Entered/Removed
    - Model Summary
    - ANOVA
    - Coefficients
  - Log
    - Regression
      - Title
      - Notes
      - Variables Entered/Removed
      - Model Summary
      - ANOVA
      - Coefficients
      - Excluded Variables
  - Factor Analysis
    - Title
    - Notes
    - Active Dataset
    - Descriptive Statistics
    - Correlation Matrix
    - Inverse of Correlation Matrix
    - Communalities
    - Total Variance Explained
    - Component Matrix
    - Reproduced Correlation Matrix
    - Rotated Component Matrix
    - Component Transformation Matrix
    - Component Plot
    - Component Score Coefficients
    - Component Score

The main window displays the following syntax:

```
GET DATA
  /TYPE=XLS
  /FILE='C:\Users\hp\Desktop\MGN 909\A898002883_23623_18_2019_multiple regression.xls'
  /SHEET=name 'factor analysis'
  /CELLRANGE=FULL
  /READNAMES=ON
  /DATATYPEMIN PERCENTAGE=95.0.

EXECUTE.

DATASET NAME DataSet2 WINDOW=FRONT.

FACTOR
  /VARIABLES PQ5 PQ6 PQ7 PQ8 PQ9 PQ10 PQ11 PQ12
  /MISSING LISTWISE
  /ANALYSIS PQ5 PQ6 PQ7 PQ8 PQ9 PQ10 PQ11 PQ12
  /PRINT UNIVARIATE INITIAL CORRELATION SIG INV REPR EXTRACTION ROTATION FSCORE
  /FORMAT SORT
  /PLOT ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /SAVE REG (ALL)
  /METHOD=CORRELATION.
```

Below the syntax, a small table shows the initial results:

	anxiety	.181 <sup>a</sup>	1.291	.214	.299	.885
a. Dependent Variable: exam score						
b. Predictors in the Model: (Constant), hours spent revising						

The status bar at the bottom indicates "IBM SPSS Statistics Processor is ready" and "Unicode ON".

The screenshot shows the IBM SPSS Statistics Viewer interface displaying the output of the Factor Analysis. The left sidebar is the same as in the previous screenshot.

The main window displays the following output:

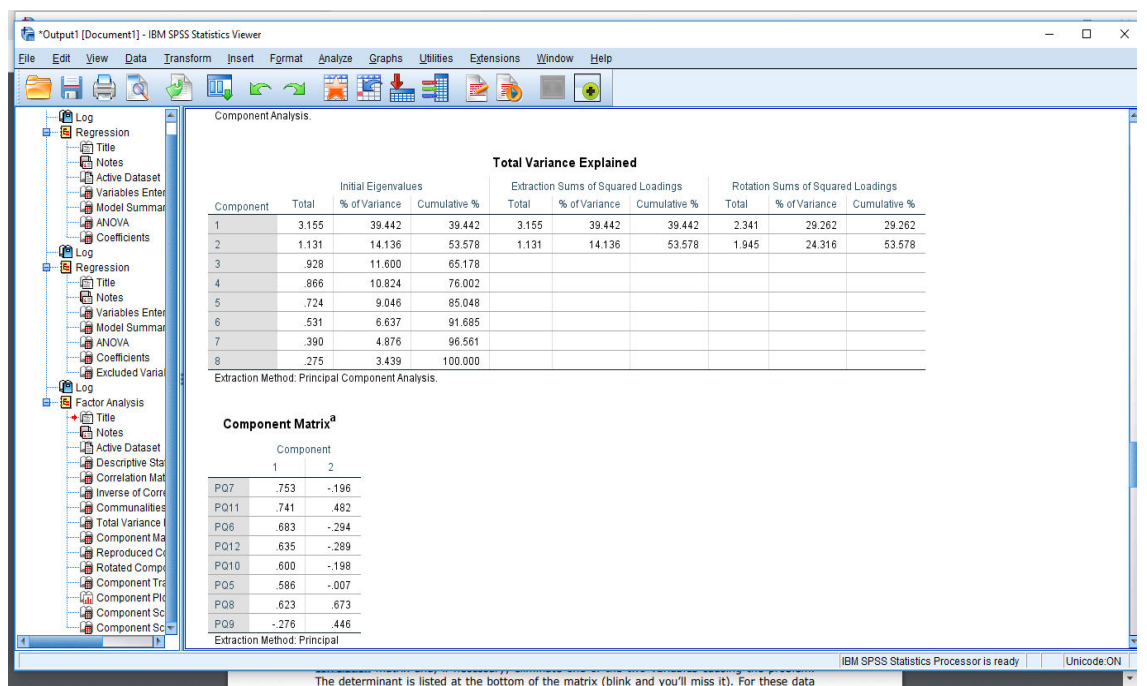
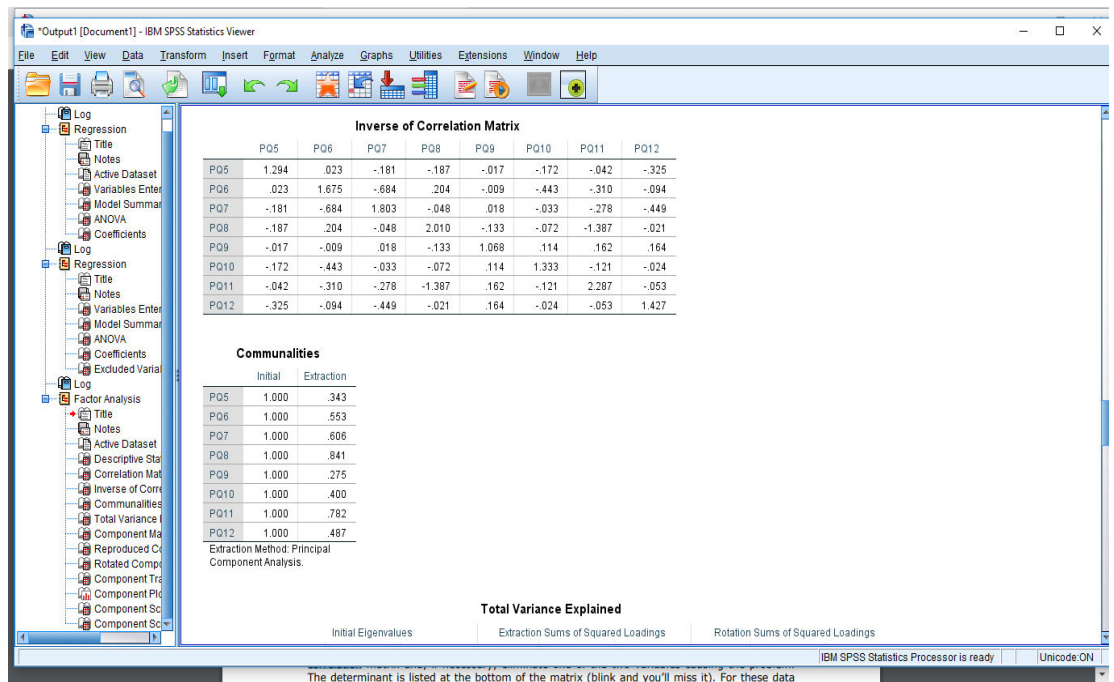
### Descriptive Statistics

	Mean	Std. Deviation	Analysis N
PQ5	2.70	.992	499
PQ6	2.23	1.135	499
PQ7	2.87	1.137	499
PQ8	2.18	.875	499
PQ9	2.95	1.295	499
PQ10	2.32	.930	499
PQ11	2.20	.893	499
PQ12	3.13	.937	499

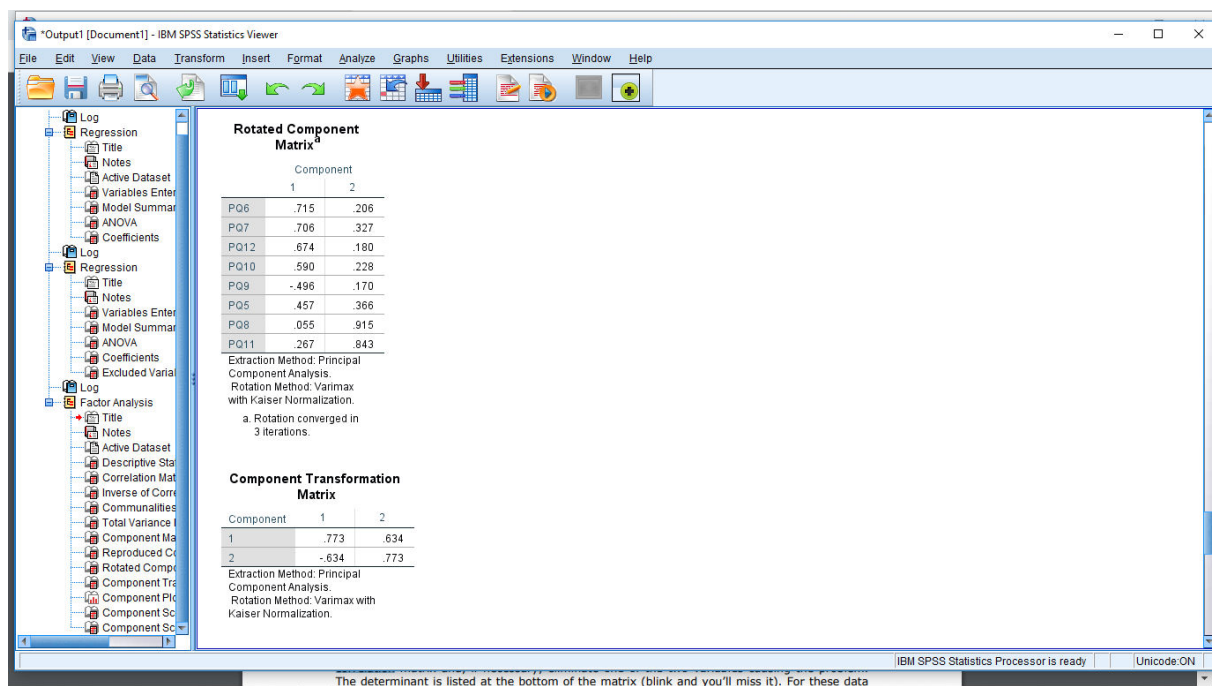
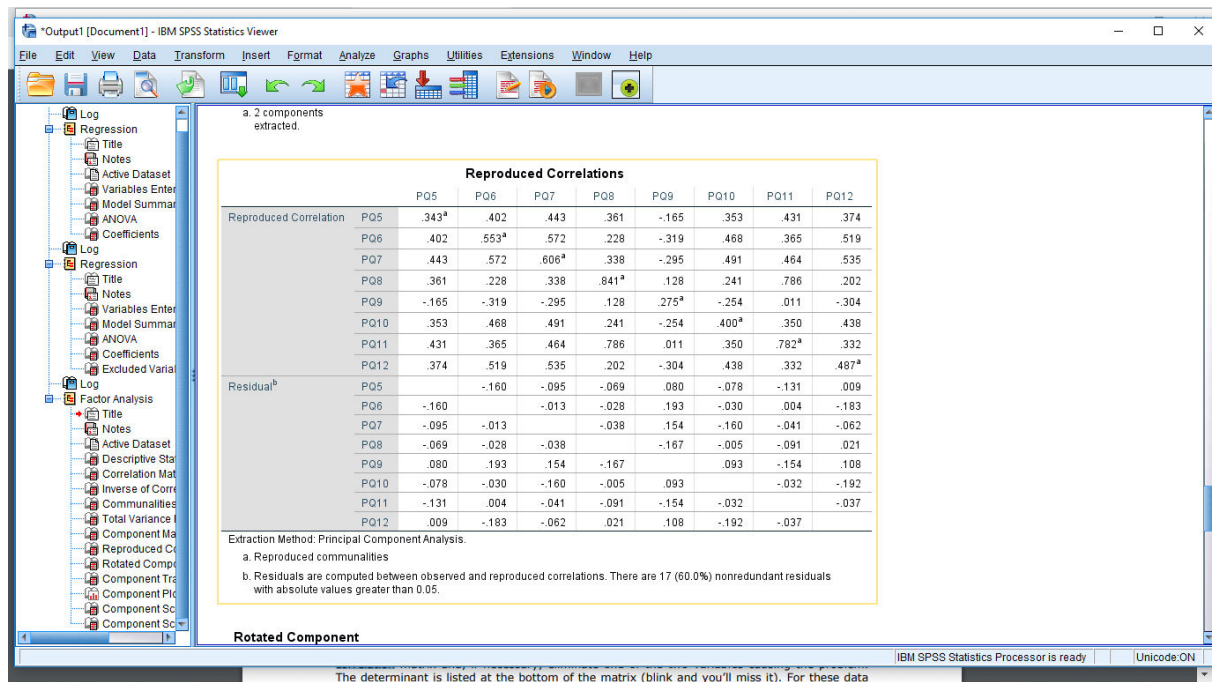
### Correlation Matrix

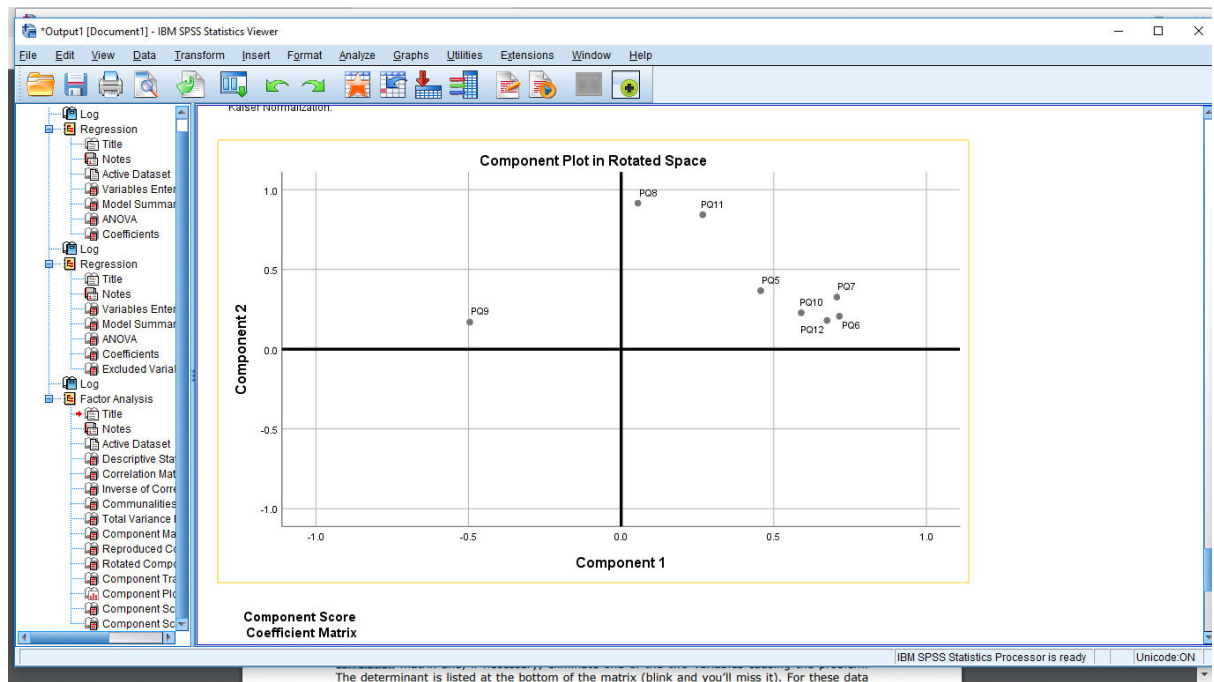
	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	
Correlation	PQ5	1.000	.242	.347	.292	-.085	.275	.300	.383
	PQ6	.242	1.000	.559	.200	-.127	.439	.369	.336
	PQ7	.347	.559	1.000	.299	-.141	.331	.423	.473
	PQ8	.292	.200	.299	1.000	-.039	.236	.696	.223
	PQ9	-.085	-.127	-.141	-.039	1.000	-.161	-.143	-.196
	PQ10	.275	.439	.331	.236	-.161	1.000	.318	.247
	PQ11	.300	.369	.423	.696	-.143	.318	1.000	.295
	PQ12	.383	.336	.473	.223	-.196	.247	.295	1.000
Sig. (1-tailed)	PQ5		.000	.000	.029	.000	.000	.000	.000
	PQ6	.000		.000	.002	.000	.000	.000	.000
	PQ7	.000	.000		.001	.000	.000	.000	.000
	PQ8	.000	.000	.000		.192	.000	.000	.000
	PQ9	.029	.002	.001	.192		.000	.001	.000

The status bar at the bottom indicates "IBM SPSS Statistics Processor is ready" and "Unicode ON".









IBM SPSS Statistics Viewer

Component Score Coefficient Matrix

	Component 1	Component 2
PQ5	.147	.113
PQ6	.332	-.063
PQ7	.294	.018
PQ8	-.225	.585
PQ9	-.317	.249
PQ10	.258	-.015
PQ11	-.089	.479
PQ12	.317	-.070

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.  
Component Scores.

Component Score Covariance Matrix

Component	1	2
1	1.000	.000
2	.000	1.000

Extraction Method: Principal Component Analysis.  
Rotation Method: Kaiser Normalization.  
Component Scores.

The R Matrix table shows that the top half of the table contains the Pearson correlation coefficient and the bottom half of the table contains the one-tailed significance.

The component matrix contains the loadings of each variable onto each factor.



# REGRESION ANALYSIS AFTER FACTOR ANALYSIS

IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Extensions Window Help

Component Ma  
Reproduced Co  
Rotated Comp  
Component Tr  
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Component Sc  
Component Sc

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Regression  
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Notes  
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ANOVA  
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Log  
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Variables Enter  
Model Summar  
ANOVA  
Coefficients  
Residuals Stati  
Charts  
Title  
\*zresid His  
PQ6 by \*zp

```

DATASET ACTIVATE DataSet2.
REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10) CIN(95)
/NOORIGIN
/DEPENDENT PQ6
/METHOD=ENTER FAC1_1 FAC2_1
/SCATTERPLOT=(PQ6 ,*ZPRED)
/RESIDUALS HISTOGRAM(ZRESID)
/SAVE ZPRED MCIN ZRESID.
    
```

**Regression**

[DataSet2]

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1 <sup>b</sup>		Enter

a. Dependent Variable: PQ6  
b. All requested variables entered.

IBM SPSS Statistics Processor is ready | Unicode ON

IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Extensions Window Help

Component Ma  
Reproduced Co  
Rotated Comp  
Component Tr  
Component Pl  
Component Sc  
Component Sc

Log  
Regression  
Title  
Notes  
Active Dataset  
Variables Enter  
Model Summar  
ANOVA  
Coefficients  
Residuals Stati  
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Log  
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Notes  
Active Dataset  
Variables Enter  
Model Summar  
ANOVA  
Coefficients  
Residuals Stati  
Charts  
Title  
\*zresid His  
PQ6 by \*zp

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.744 <sup>a</sup>	.553	.551	.760

a. Predictors: (Constant), REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1  
b. Dependent Variable: PQ6

**ANOVA<sup>a</sup>**

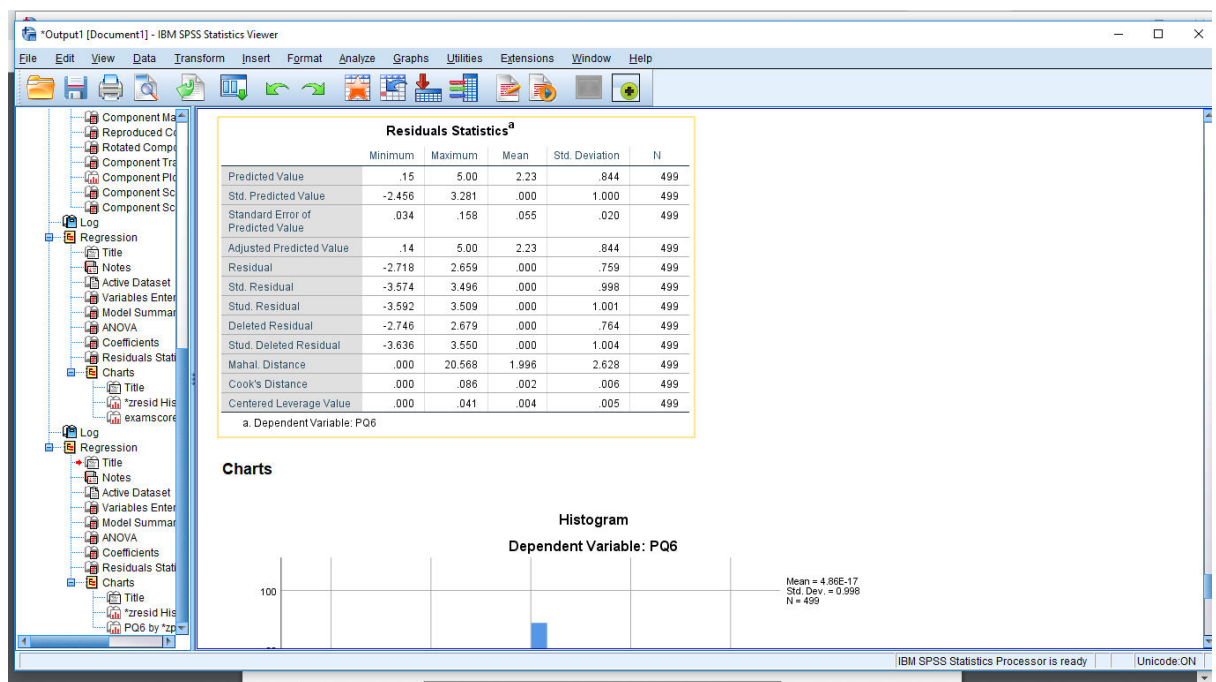
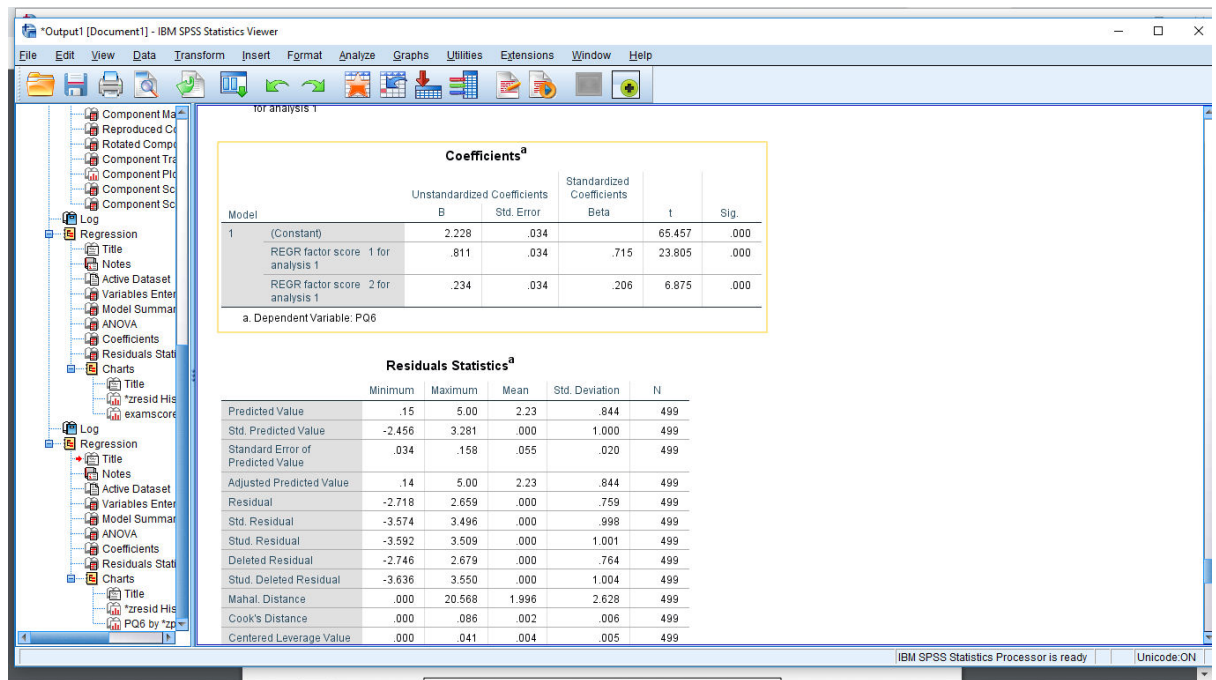
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	355.089	2	177.545	306.980	.000 <sup>b</sup>
	Residual	286.866	496	.578		
	Total	641.956	498			

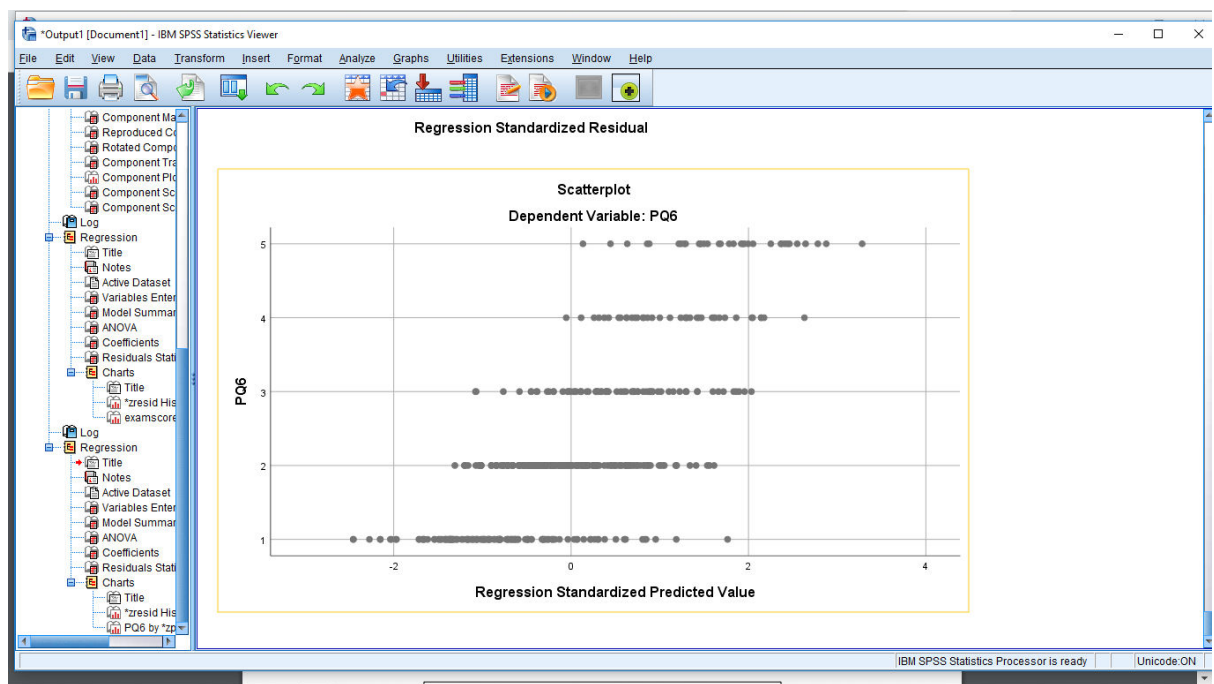
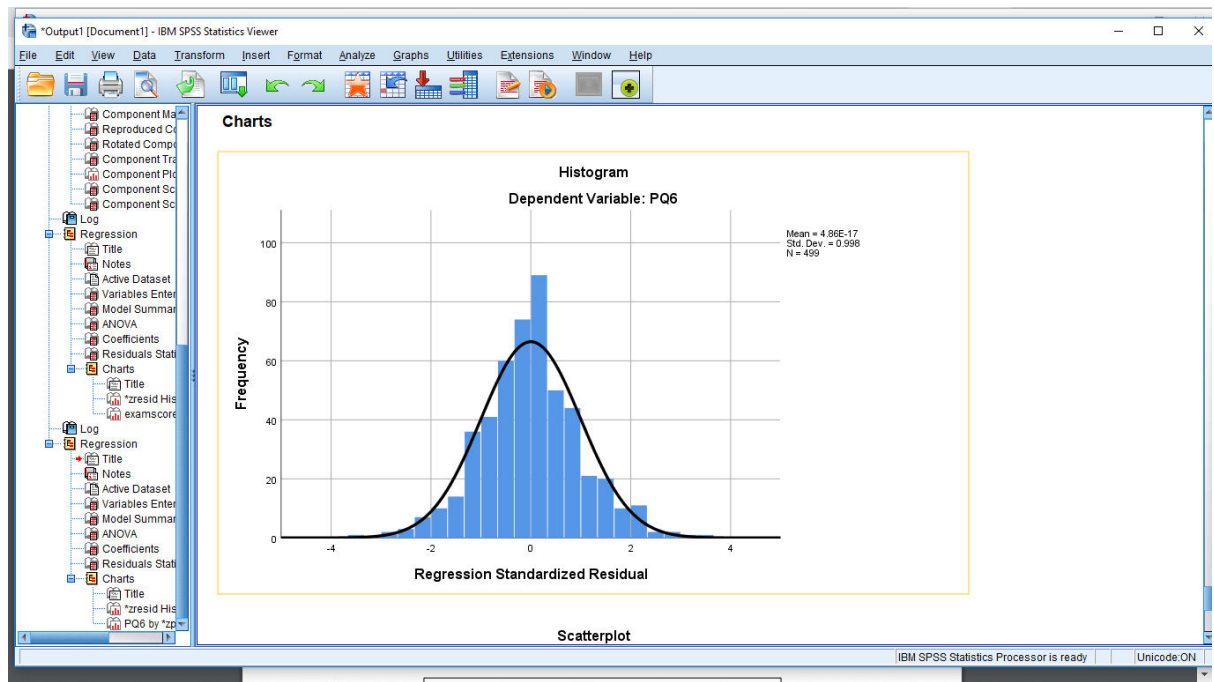
a. Dependent Variable: PQ6  
b. Predictors: (Constant), REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.
1	(Constant)	2.228	.034	65.457	.000
	REGR factor score 1 for analysis 1	.811	.034	23.805	.000
	REGR factor score 2 for analysis 1	.234	.034	6.875	.000

IBM SPSS Statistics Processor is ready | Unicode ON





The scatterplot shows that there is relation ship between the PQ6 and standardized predicted value and it is constant.

The R Square value is equal to 0.553 it means we can use it for further use but its only 55% correctly give solution.

The coefficent for factor score 1 is 0.811 and factore score 2 is 0.234.