



"Investing in Africa's Future"

COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES

NMEC 209: COMPUTER AND STATISTICAL ANALYSIS

SECOND SEMESTER EXAMINATIONS

APRIL 2026

LECTURER: MR G MANDEWO

TIME: 3 HOURS

INSTRUCTIONS

ANSWER ANY **FOUR QUESTIONS** FROM THIS PAPER
MARKS ALLOTTED TO EACH QUESTION ARE SHOWN

CLEAR AND NEATLY PRESENTED WORK WILL BE AWARDED MARKS FOR PRESENTATION

Quest

Question 1

The works department is estimating the cost of constructing a perimeter wall. The works manager believes that the standard perimeter wall should be 25 metres high. To avoid confusion, the works director requested the section to carry out a research and 30 walls were sampled for the study. The average wall height was found to be 22 metres with a sample standard deviation of 8 metres.

- (i) Explain the difference between null hypothesis and alternative hypothesis [5 marks]
- (ii) Under what circumstances can Z distribution tables be used instead of t distribution tables? [5 marks]
- (iii) Test the hypothesis at 1% significance level that the average height is at least 25 metres. [5 marks]

- (b) Read the following results from a statistical software [10 marks]

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.915 ^a	.837	.817	44.008	.837	43.529	2	17	.000	.647

a. Predictors: (Constant), Religion, Income

b. Dependent Variable: Cons

Question 2

(a) As an economist at a large supermarket, you have been tasked with investigating how bread prices and advertising expenditure influence bread sales across a sample of 45 shops. After collecting the relevant data and running the model, you obtain the following results.

Note: the following (y: bread sales, x1: bread prices and x2: advertising expenditure)

regress y x1 x2

Source	SS	df	MS	Number of obs	=	45
Model	1559.00373	2	779.501867	F(2, 42)	=	24.82
Residual	1318.90738	42	31.4025566	Prob > F	=	0.0000
				R-squared	=	0.5417
				Adj R-squared	=	0.5199
Total	2877.91111	44	65.4070707	Root MSE	=	5.6038

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1	-25.58809	5.607816	-4.56	0.000	-36.90512	-14.27106
x2	.2518587	.0662506	3.80	0.000	.1181596	.3855578
_cons	18.23976	3.352496	5.44	0.000	11.47415	25.00537

Comment on the following;

- R-squared **[2 marks]**
- Confidence intervals **[2 marks]**
- T-statistic **[2 marks]**
- P-value **[2 marks]**
- Estimated parameters **[2 marks]**

(b) From the results above,

- Specify the ordinary least squares model with estimated parameters. **[5 marks]**
- Calculate the predicted volume of sales for the following scenarios:

When Price = \$0.50 and Advertising Expenditure = \$400.

When Price = \$2.00 and Advertising Expenditure = \$150. **[5 marks]**

(c) Given the results, what is the best strategy in order to maximize bread sales. **[5 marks]**

Question 3

- Measures of central tendencies and measures of dispersion would assist a statistician to determine the subtle patterns in the data. You are required to use a data set of your own choice to explore all concepts and show how the concepts are related. **[15 Marks]**
- Given the following results from a statistical software, give a comprehensive interpretation of these results **[10 Marks]**

Coefficients ^a							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-112.018	45.734		-2.449	.025	-208.508	-15.529
1 Income	.589	.065	.907	9.063	.000	.452	.726
Religion	6.872	20.198	.034	.340	.738	-35.741	49.485

a. Dependent Variable: Cons

Question 4

a) Calculate the correlation coefficient between the variables

$$X = [1, 2, 3, 4, 5] \text{ and } Y = [2, 4, 5, 4, 5]. \quad [5 \text{ marks}]$$

b) Given the regression equation

$$\hat{Y} = 3 + 2X$$

predict the value of Y when X = 7. [5 marks]

c) Explain the assumptions underlying linear regression and discuss how violations of these assumptions might affect the results. [5 marks]

(d) As a research assistant at the Ministry of industry and commerce in your country the chief economist gives you the Stata output below. The research seeks to investigate the relationship between Gross Domestic product ((GDP), Foreign Direct Investment (FDI), and Inflation (INF).

`summarize GDP FDI INF`

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	40	1573.115	872.8315	543.2	3477.6
FDI	40	674.19	480.1339	120.5	1749.9
INF	40	10.895	4.682863	3.2	18.7

Provide a detailed descriptive statistic for the research.

[10 marks]

Question 5

- a) Explain the difference between simple random sampling and stratified sampling. Give an example where stratified sampling would be preferred. **[5 marks]**
- b) Describe two common data cleaning techniques you would apply before analysis. **[5 marks]**
- c) Read and interpret the following tables
 - (i) **[2 marks]**

Descriptive Statistics

	Mean	Std. Deviation	N
Cons	304.70	102.989	20
Income	701.25	158.661	20
Religion	.55	.510	20

- (ii) **[3 marks]**

Correlations

		Cons	Income	Religion
Pearson Correlation	Cons	1.000	.914	.218
	Income	.914	1.000	.202
	Religion	.218	.202	1.000
Sig. (1-tailed)	Cons	.	.000	.178
	Income	.000	.	.196
	Religion	.178	.196	.
N	Cons	20	20	20
	Income	20	20	20
	Religion	20	20	20

marks]
[5

(iii) [5 marks]

Model Summary^b

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a. Predictors: (Constant), Religion, Income

b. Dependent Variable: Cons

(iv) [5 marks]

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	168604.713	2	84302.356	43.529	.000 ^b
	Residual	32923.487	17	1936.676		
	Total	201528.200	19			

a. Dependent Variable: Cons

b. Predictors: (Constant), Religion, Income

END OF EXAMINATION