AFRICA UNIVERSITY
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COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NMEC 103: STATISTICS FOR ECONOMISTS 1

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2022

LECTURER: Mr Mandewo

TIME: 3 HOURS

INSTRUCTIONS

Answer Question **number 1 and any three questions.** Total possible mark is **100.**

Start **each** question on a new page in your answer booklet.

The marks allocated to **each** question are shown at the end of the question.

You will be given formula booklet foe this exam.

QUESTION 1

(a) You are given the following distribution of student marks after an in class test

Table 1. Student marks

Marks	No of students
20<30	7

30<40	12
40<50	8
50<60	3
60<70	2

You are required to;

i) Construct the frequency polygon for showing the distribution of student marks. **[5 marks]**

ii) Construct the less cumulative frequency polygon. **[5 marks]**

iii) Construct a histogram **.** **[5 marks]**

iv) To explain the difference between a cumulative frequency polygon and a frequency polygon. **[5 marks]**

(b) Using information from table 1 above, estimate

i) The mean mark. **[5 marks]**

ii) The modal mark **[5 marks]**

iii) The median mark **[5 marks]**

iv) The standard deviation. **[5 marks]**

QUESTION 2

a) Define the following terms as used in business statistics;

i) Scatter plot. **[2 marks]**

ii) Correlation analysis. **[2 marks]**

iii) Coefficient of determination. **[2 marks]**

b) The data in Table 2 shows how sales respond to number of advertisement flights in a newspaper;

Table 2. Sales response to advertisement

No of newspaper advertisements	5	4	6	6	5	6	4	5
Sales in thousand dollars	42	38	35	40	44	38	45	42

i) Determine the independent and dependent variables. **[2 marks]**

ii) Estimate the linear regression equation of sales on advertisement **[5 marks]**

iii) Interpret the slope of regression line. **[2 marks]**

iv) Find the sales value if there are 8 advertisements. **[2 marks]**

v) Calculate Pearson's correlation coefficient (r) and interpret it. **[3 marks]**

QUESTION 3

(a) 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 **[4 marks]**

ii. Under what circumstances can Z distribution tables be used instead of t distribution tables?

[4 marks]

iii. Test the works manager's hypothesis at 1% level of significance. **[4 marks]**

iv. Can we come up with the same conclusion at 5% level of significance? **[4 marks]**

v. Test the hypothesis at 1% significance level that the average height is at least 25 metres.

[4 marks]

QUESTION 4

a. At a children's home, the matron wanted to know the average number of soap tablets used by 25 children per year. The sample mean was found to be 170 tablets and the standard deviation of 22 tablets.

i. Using 95% confidence interval, estimate the actual mean tablets used by each child and comment. **[4 marks]**

ii. What can we say about the mean at 90% confidence interval? **[4 marks]**

b. Classify the following examples of data as ordinal, nominal, interval or ratio. Justify your classification.

i. Temperature of a patient; **[4 marks]**

ii. Brand of a phone **[4 marks]**

iii. Students' examination marks **[4 marks]**

QUESTION 5

(a)The grain marketing board carried out a survey on soya been yield. Thirty farmers were interviewed and their yield per hectare in tones is recorded below

36 39 49 45 25 34 50 31 40 48 42 35 30 46 38
39 44 52 41 47 35 41 61 53 28 46 54 55 60 27

Required

i. Construct a frequency distribution using class intervals **[4 marks]**

ii. Draw the less than ogive curve and approximate the median yield. **[4 marks]**

iii. Draw a frequency histogram and approximate the modal yield. **[4 marks]**

iv. Using data from the frequency table in estimate the average soya bean yield per hectare. **[4 marks]**

v. Estimate the median yield. **[4 marks]**

QUESTION 6

b. After harvesting the soya bean, only eight farmers took some of their produce to grain marketing board. The number of tonnes sold and the revenue received by farmers is shown in table 1 below:

Farmer	Soya beans sold (tonnes)	Revenue received (ZWL, 000)
1	10	12
2	12	16
3	8	10
4	15	20
5	9	11
6	10	9
7	7	8
8	14	17

i. Present the information graphically and comment **[4 marks]**

ii. Estimate the regression equation that explains the relationship between soya beans sold and revenue received. **[4 marks]**

iii. Using Pearson's correlation coefficient, determine the nature of the relationship between soya beans sold and revenue. **[4 marks]**

iv. What is the proportion of revenue variation that is attributed to tonnage of soya beans sold? **[4 marks]**

v. Estimate the possible the amount of revenue that can be received by the farmer after selling 35 tonnes of soya beans. **[4 marks]**

END OF EXAMINATION