

COURSE CODE : MATH 130
COURSE TITLE : BASIC STATISTICS

INSTRUCTIONS

- *Answer Question ONE (compulsory) and any other TWO Questions*

Question 1

a) i). Solve for x

$$3 + \frac{1}{x+1} = \frac{4x}{x-1} \quad (3 \text{ marks})$$

ii). Solve the following quadratic equation $2x^2 - 6x - 20 = 0$ (3 marks)

(iii) Simplify $\left(\frac{xy}{z}\right)^4 \cdot \left(\frac{z^4}{x^2}\right)^{1/2}$ (2 Marks)

(b) Define the following terms (4 Marks)

(i). Population

(ii). Sample

(iii). "Statistic"

(v). Parameter

(c) The following table shows the masses of 75 adult men

Mass in kg	90 – 99	80 – 89	70 – 79	60 – 69	50 – 59	40 – 49	30 – 39
No. of men	2	12	22	20	14	4	1

- i). State the model class (1 mark)
- ii). Construct a frequency table and use it to calculate the mean, median and standard deviation. (9 marks)
- iii). On the same axis represent the data using an histogram and frequently polygon curve (3 marks)
- iv). Using the histogram drawn in (iii), estimate the mode. (1 mark)

v). Calculate the pearson's coefficient of skewness
(2marks)

(d) State two properties of a good average (2 marks)

Question 2

a) Distinguish between correlation and causation (4 marks)

b) A food production company in Nairobi city collected data on the monthly income and food expenditure of seven households. The data are as follows.

Income (khs 1000)	35	49	21	39	15	28	25
Food expenditure (kshs 1000)	9	15	7	11	5	8	9

vi). Complete the coefficient of correlation and state whether there is an evident relationship between income and food expenditure. (5 marks)

vii). Plot a scatter diagram of the data. (3 marks)

viii). Determine the regression equation and draw the line of the best fit on (ii) above. (4 marks)

ix). From (iii) above compute the estimated food expenditure if household income is ksh. 3100. (2 marks)

(c) Describe one difference between correlation and regression. (2 marks)

Question 3

a) The following data shows the age of 117 students in a city college.

Age (in years)	17-19	19-21	21-23	23-25	25-27	27-29	29-31
No. of students	2	12	22	20	14	4	1

Construct an ogive from the data and use it to estimate;

i). The median

ii). The number of students aged between 21 to 26 years. (6 marks)

b) List three characteristics of a normal distribution. (3 marks)

c) Solve for x (4Marks)

(i). $4y + 2x = 7y$

(ii). $\frac{3}{2}x - \frac{2}{3}x = 2$

(iii). Solve the inequality

$$\frac{x+2}{x-1} < 2 \quad (4 \text{ marks})$$

(iv). Find 3 positive numbers whose sum is 44 if the second number is twice the first and the third number is two-thirds the first.
(3marks)

Question 4

The data below represent the number of outpatients who visited a district hospital in a period of 35 days.

47	68	88	76	84	53	108
155	115	106	95	78	64	92
65	87	55	122	98	86	105
107	66	95	56	105	104	98
87	75	87	77	82	107	82

a) Classify the data in equal class intervals (5 classes)

(5 Marks)

b) Create a table with (6 Marks)

(i) Frequencies

(ii) Equal class boundary

(iii) Mid point values

c) (i) State the median class (1 Mark)

(ii) State the modal class (1 Mark)

d) Distinguish between :

(i) discrete and continuous data .

(2marks)

(ii) Primary and secondary data

(2 Marks)

e) Discuss the importance of statistics in education management

(3marks)