

MATH 141: INTRODUCTION TO STATISTICS

STREAM: Y1 S2

TIME: 2 HOURS

DAY:

DATE:

INSTRUCTIONS

1. Do not write anything on this question paper.
2. Answer Question **ONE(COMPULSORY)** and any other **TWO** questions.

QUESTION ONE (30 MARKS)

a. A random sample of 50 households in a certain town was selected and their monthly expenditure in thousands was recorded as follows:

28	35	61	29	36	48	57	67	69	50
48	40	47	42	41	37	51	62	63	33
31	32	35	40	38	37	60	51	54	56
37	46	42	38	61	59	58	44	39	57
38	44	45	45	47	38	44	47	47	64

i) Construct a frequency distribution table taking 25-34, 35-44 etc as class intervals. (4mks)

ii) Using the frequency distribution table of (i):

- Calculate the modal expenditure. (4mks)
- Calculate the mean expenditure. (4mks)
- Calculate the median expenditure. (4mks)
- Draw the histogram (4mks)

b) Find the number of permutations of the letters of the word “JOMMOKENYATTAOFKENYA” (3mks)

c) In how many ways can 10 board members sit around a circular table? If the chairman must sit between the secretary and the treasurer? (3mks)

e) Describe:

- i) basic steps of survey (3mks)
- ii) two methods of survey (2mks)

QUESTION TWO (20 MARKS)

a. Explain the difference between correlation and regression (2mks)

b. A researcher assumes that there is a linear relationship between the amount of fertilizer supplied to tomato plants and subsequent yield of tomatoes obtained. Eight tomato plants of the same variety were selected at random and teated weekly with a solution in which x grams of fertilizer was dissolved in a fixed quantity of water. The yield y kilogram of tomatoes were recorded.

Plant	A	B	C	D	E	F	G	H
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x	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
y	3.9	4.4	5.8	6.6	7.0	7.1	7.3	7.7

- i) Plot a scatter diagram of yield y against amount of fertilizer x . (2mks)
ii) Find the equation of the least squares regression line of y on x . (8mks)
ii) Estimate the yield of a plant treated weekly with 3.2 grams of fertilizer. (2mks)
c) Describe any three methods of sampling (3mks)

QUESTION THREE (20 MARKS)

- a. By citing an appropriate example in each case, explain the difference between mutually exclusive events and independent events. (4mks)
b. Five percent of all car batteries manufactured by a large company are defective. A quality control inspector randomly selected 3 batteries from the production line. What is the probability that exactly one of these is defective? (5mks)
c. The table below shows a verbal reasoning test score x and an English test score y for each of a random sample of 8 children who took both tests.

Child	A	B	C	D	E	F	G	H
x	112	113	110	113	112	114	109	113
y	69	65	75	70	70	75	68	76

- i) Calculate the value of the product moment correlation coefficient (r) between the scores. (9mks)
ii) Comment briefly on the results obtained in (i) above. (2mks)

QUESTION FOUR (20 MARKS)

- a. Distinguish between the following terms;
i) Descriptive and inferential statistics (2mks)
ii) Continuous and discrete variable (2mks)
iii) Skewness and kurtosis (2mks)
b. The table below show the monthly electricity consumption for 100 households in Kilowatt hour

Monthly Consumption (Kwh)	Number of households
20-39	5

40-59	15
60-79	25
80-99	30
100-119	18
120-139	7

Estimate the median consumption, the standard deviation, hence calculate the Karl Pearson's coefficient of skewness and interpret it. (14mks)

QUESTION FIVE (20 MARKS)

a. The table below shows marks scored in a mathematics test :

marks	13	15	16	17	18	20	23	24	25
Number of students	1	3	2	3	4	2	5	3	4

Calculate

- i) mean mark (3mks)
- ii) median mark (3mks)
- iii) standard deviation (3mks)

b) The following data shows the number of malaria related infant deaths in a local hospital between June and December 2017.

Month	June	July	August	Sept	October	November	December
Number of deaths	8	25	10	14	21	16	27

Draw a pie-chart to represent the data. (3mks)

- a. A number is selected at random from integers between 20 and 34 inclusive. For the number selected, find the probability that:
 - i) its second digit is greater than its first digit. (2mks)
 - ii) It is divisible by 4 (2mks)
 - iii) Its second digit is greater than its first digit and is divisible by 4 (2mks)
 - iv) Its second digit is greater than its first digit or is divisible by 4 (2mks)