



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

SCHOOL OF APPLIED SCIENCES

DIPLOMA IN NUTRITION

COURSE CODE: DND 1105

COURSE TITLE: BASIC MATHEMATICS

DATE:

TIME:

INSTRUCTIONS TO CANDIDATES

- i. This paper consists of three sections
- ii. Answer **ALL** Question in Section **One and two**
- iii. Answer two questions in section **Three**

This paper consists of **XXXXXXXXXX** printed pages. Please turn over.

SECTION 1: Answer all questions – 20marks

1. Which one of this is unaffected by outliers?
 - (a) Mean
 - (b) Mode
 - (c) Standard deviation
 - (d) Range
2. Since the mode is the most frequently occurring data value in the data distribution, it is;
 - (a) Always equal to the mean
 - (b) Larger than the mean
 - (c) At least two
 - (d) Always smaller than the median
3. The value of x if 3,18 and x, 42 are in proportion is;
 - (a) 6
 - (b) 54
 - (c) 7
 - (d) 3
4. Which of the following is true about probability?
 - (a) The probability of an impossible event is 0
 - (b) Probability can be greater than 1
 - (c) Probability can be less than 0
 - (d) The probability of a sure event is 0
5. The transpose of a row matrix is a;
 - (a) Diagonal matrix
 - (b) Zero matrix
 - (c) Column matrix
 - (d) Identity matrix
6. Which of the following is an inverse of matrix A?
 - (a) A^1
 - (b) A^{-1}

(c) A^c

(d) A

7. Which of the following describes the number on top of a fraction?

(a) Number

(b) Denominator

(c) Numerator

(d) Factor

8. What type of a fraction is $\frac{9}{7}$?

(a) Proper fraction

(b) Mixed number fraction

(c) Like fraction

(d) Improper fraction

9. Which of the following fraction is equivalent to $\frac{2}{5}$?

(a) $\frac{4}{8}$

(b) $\frac{5}{2}$

(c) $\frac{4}{10}$

(d) $\frac{3}{15}$

10. The data below shows marks scored by interviewees in an interview

54, 80, 65, 75, 96.

Which is the median mark?

(a) 65

(b) 80

(c) 74

(d) 75

11. Which one of the following is not a frequency curve?

(a) Ogive

(b) Pictogram

(c) Histogram

(d) Polygon

12. If two events A and B are mutually exclusive, then

(a) They must be independent events

- (b) They cannot be compliments
- (c) They cannot happen together
- (d) They can happen together

13. Which one of the following is not a measure of central tendency?

- (a) Variance
- (b) Mode
- (c) Mean
- (d) Median

14. Matrix $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ can be defined as:

- (a) Identity matrix
- (b) Scalar matrix
- (c) Diagonal matrix
- (d) Null matrix

15. Which of the following matrices have an inverse matrix?

- (a) $\begin{pmatrix} 3 & 0 \\ 0 & 1 \end{pmatrix}$
- (b) $\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$
- (c) $\begin{pmatrix} 2 & 2 \\ -2 & -2 \end{pmatrix}$
- (d) $\begin{pmatrix} 3 & 4 \\ 0 & 0 \end{pmatrix}$

16. A vendor bought an item for sh.80 and later sold it at sh.100. What was the profit margin as a percentage?

- (a) 25%
- (b) 20%
- (c) 40%
- (d) 10%

17. There are 7 green apples and 5 red apples in a basket. What was the probability of picking a red apple?

- (a) $\frac{5}{7}$
- (b) $\frac{5}{12}$

(c) $7/5$

(d) $7/12$

18. If the value of a variable X is -90, -50, -56, -7, -28, what is the range?

(a) -83

(b) 83

(c) -97

(d) 97

19. Two matrices A and B can be multiplied if

(a) They are of the same order

(b) They have the same number of rows

(c) The number of rows in matrix A is equal to the number of columns matrix B

(d) The number of columns in matrix A is equal to the number of rows matrix B

SECTION 11- Answer all questions - 40 MARKS

20. Differentiate the following function

$Y = -3x^4 + x^3 + x^2 + x$ (4 Marks)

21. The data below shows the time taken in minutes by ten athletes to complete a race;

60, 50, 52, 38, 58, 34, 52, 57, 44

Calculate the mean, mode and standard deviation of the distribution (6 Marks)

22. The number of female students in State College is 2,100. If the probability of selecting a female student at random from the college is $4/7$, calculate the number of male students in the college.

(4 marks)

23. Given 50%, 64%, 25%, 76%, calculate the Geometric mean (4 marks)

24. Use indices to find the value of x

$4^{(2x-3)} = 1,024$ (2 marks)

25. Integrate $4x^3 - 6x^2 + 8x - 5$ with respect to x (5 marks)

26. Solve the following simultaneous equations (5 marks)

$$6x+2y=102$$

$$4x+3y=98$$

27. Factorise; $12y^2 - 20y + 3$ (3 marks)

28. Expand; $(x + 4)(x - 2)$ (3 marks)

29. The market price of a business mathematics book is sh.800. the seller offers a cash discount of 5%. Determine the price of the book after the discount. (4 marks)

SECTION III- answer any two questions - 40 MARKS

30. The following table shows the profit earned by Small and Medium Size Enterprises (SMSEs) in Kenya.

Profit sh. 'million'	Number of companies
10-20	10
20-30	8
30-40	5
40-50	22
50-60	15
60-70	12
70-80	8

Required

i) The arithmetic mean profit (3 marks)

ii) The median profit (3 marks)

iii) The modal profit (3 marks)

iv) The standard deviation of the profit (4 marks)

v) Coefficient of variation (3 marks)

b) Explain four advantages of the arithmetic mean as a measure of central tendency (4 marks)

31.

a) Explain four applications of matrices in business (4 marks)

b) A global conference on "the blue economy" was recently held in Kenya and was attended by 280 delegates from America, Europe and Africa

The following information relates to the delegates who attended the conference

70 delegates represented Europe

96 delegates represented Africa

128 delegates represented America

20 delegates represented all the three continents

25 delegates represented America and Africa

22 delegates represented America and Europe

26 delegates represented Europe and Africa

Required

- i) Present the above information in the form of a Venn diagram
- ii) The number of delegates who represented at least two continents
- iii) The number of delegates who represented only one continent
- iv) The number of delegates who represented none of the three continents (16 marks)

32. a) Discuss briefly four reasons for studying statistics (8 marks)

b)The following table shows the levels of retirement benefits given to a group of workers in a given establishment.

Retirement benefits £ '000	No of retirees (f)
20 – 29	50
30 – 39	69
40 – 49	70
50 – 59	90
60 – 69	52
70 – 79	40
80 – 89	11

Required

- i. Determine the semi-interquartile range for the above data
- ii. Determine the minimum value for the top ten per cent.(10%)
- iii. Determine the maximum value for the lower 40% of the retirees (12 marks)

THE ENDS