



NESAS NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

SUBSIDIARY MATHEMATICS
SM002
09/07/2025 8.30 AM-11.30 AM

Names:
Index number:

SUBJECT : SUBSIDIARY MATHEMATICS

OPTION : ACCOUNTING

DURATION: 3 HOURS

S6 QUESTIONS and ANSWERS BOOKLET

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2024-2025

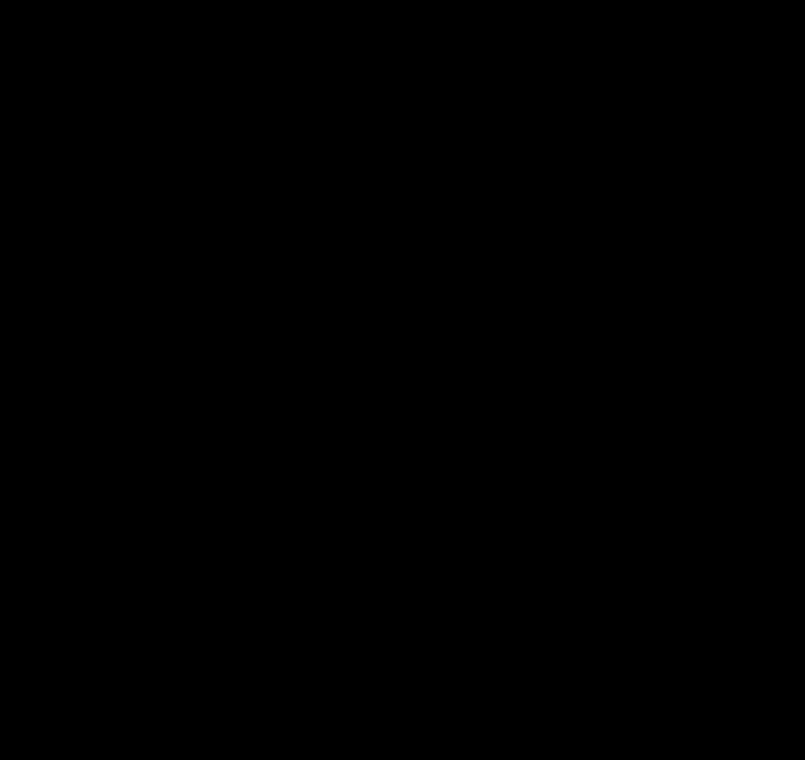
Instructions to candidates:

- 1) Write your names and index number on the answer booklet as written on your registration form.
2) Do not open this question paper until you are told to do so.
3) This paper consists of two sections: A and B.
Section A: Attempt all questions. (55 marks)
Section B: Attempt only three questions. (45 marks)
4) Geometrical instruments and silent non-programmable calculators may be used where it is necessary.
5) Use only a blue or black pen.

TOTAL MARKS...../ 100

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Table with 4 columns: Questions, Marks, Questions, Marks. Rows 1-15.



SECTION A: Attempt all questions (55 marks)

For all multiple choice questions, circle the letter corresponding to correct answer.

1) Which letter corresponds to the set of prime numbers? **(2 marks)**

a) $A = \{2,3,5,7,9,11\}$.

b) $B = \{2,3,5,7,9\}$.

c) $C = \{2,5,7,9,11\}$.

d) $D = \{3,5,7,11\}$.

2) Write a letter that reflect the simplified answer of this expression

$|8: 4 \times (-2) + 3 - 1|$?

(2 marks)

a) 3

b) 2

c) -2

d) $\frac{-3}{4}$

3) Consider the data 15, 12, 13, 13, 9, 10, 8, 11, 10, 8, 7, 9, 10, 10. Which letter corresponding to the median of the given data? **(2 marks)**

a) 9.5

b) 11

c) 10

d) 8

4) The value of $\lim_{x \rightarrow 2} \left(\frac{x^2 - 4}{x - 2} \right)$ is one the following solutions. Choose a letter corresponding to the correct solution. **(2 marks)**

a) $\frac{0}{0}$

b) ∞

c) 2

d) 4

5) From the provided answers below, choose a letter that matches with derivative of the function $f(x) = \frac{1}{x+1}$ at point $x = 1$. **(3 marks)**

- a) $\frac{1}{4}$
- b) 0
- c) 1
- d) $-\frac{1}{4}$

6) The production function of a commodity is given by $Q = 40p + 3p^2 - \frac{1}{3}p^3$, where Q is the total output and p is the number of units of input. Which letter corresponds to the value of the marginal product for $p = 3$? **(3 marks)**

- a) 49
- b) 129
- c) 46
- d) 67

7) Given the matrix $A = \begin{pmatrix} 3 & -8 & 7 \\ 23 & 6 & -9 \\ 7 & 9 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 4 & 50 & 60 \\ -7 & -5 & -12 \\ 4 & -13 & 16 \end{pmatrix}$, which letter corresponds to the correct answer of $3A - 2B$? **(4 marks)**

a) $\begin{pmatrix} 1 & -124 & -99 \\ 83 & 28 & -3 \\ 13 & 53 & -20 \end{pmatrix}$

b) $\begin{pmatrix} 1 & -124 & 99 \\ 83 & 28 & -3 \\ 13 & 53 & -20 \end{pmatrix}$

c) $\begin{pmatrix} 1 & -124 & -99 \\ 83 & 28 & -3 \\ 13 & 53 & 20 \end{pmatrix}$

d) $\begin{pmatrix} 1 & -124 & -99 \\ 83 & 8 & -3 \\ 13 & 53 & -20 \end{pmatrix}$

8) The solution of the equation $2 \ln 4x = 7$ is among the answers given below.

Which letter goes with that solution?

(4 marks)

a) $\frac{7}{8}$

b) $\frac{e^{\frac{7}{2}}}{4}$

c) $e^{\frac{7}{2}}$

d) $\frac{e^7}{4}$

9) A company produces three products every day. Their total production on a certain day is 45 tons. It is found that the production of the third product exceeds the production of first product by 8 tons while the total combined production of the first and the third product is twice that of the second product. Choose a letter that corresponds to the production level of each product.

(4 marks)

a) The first product level is 11 tons, second product level is 19 tons and the third product level is 15 tons.

b) The first product level is 19 tons, second product level is 11 tons and the third product level is 15 tons.

c) The first product level is 15 tons, second product level is 11 tons and the third product level is 19 tons.

d) The first product level is 11 tons, second product level is 15 tons and the third product level is 19 tons.

10) A car of a professor has an initial value of Frw 3 million. One of her students plans to buy it when the car worth Frw 1 million. If the rate of depreciation is 14% per annum. Find after how many complete years the professor will sell the car to the student. Choose the letter corresponding to the right answer.

(4 marks)

- a) 4.60 years
- b) 6.64 years
- c) 14.29 years
- d) 7.28 years

11) A \$ 1000 deposit is made at a bank that pays 12% compounded annually. How much will someone have in his/her account at the end of 10 years? Choose a letter that corresponds to the right answer.

(5 marks)

- a) \$310.85
- b) \$3300.39
- c) \$3315.53
- d) \$3106.23

12) Which letter is corresponding to the domain of definition of the function

$$f(x) = \frac{1+\ln x}{-1+\ln x}$$

(5 marks)

- a) $]0, e] \cup]e, +\infty[$
- b) $]0, e[\cup]e, +\infty[$
- c) $]0, e[\cup e, +\infty[$
- d) $]0, e] \cup e, +\infty[$

13) Consider a product with unit price $P = 200\text{Frw}$, unit variable cost $V = 140\text{Frw}$ and fixed cost $f = 8,000,00\text{Frw}$. Determine the break-even sales units and find out the sales units required to make a profit of $2,000,000\text{Frw}$. Choose letter that corresponds to the right answer. **(5 marks)**

- a) The break-even sales units is 13333 units and the sales units required to make a profit of 2000000 Frw is 46650 units.
- b) The break-even sales units is 13320 units and the sales units required to make a profit of 2000000 Frw is 46650 units.
- c) The break-even sales units is 13335 units and the sales units required to make a profit of 2000000 Frw is 46650 units.
- d) The break-even sales units is 13333 units and the sales units required to make a profit of 2000000 Frw is 46667 units.

14) The marginal cost function of manufacturing x units Frw of a product is $5 - 8x + 3x^2$ Frw. What is the true value of the total cost of producing 10 up to 25 items? Choose a letter reflecting the right answer? **(5 marks)**

- a) 123,300Frw
- b) 12,600Frw
- c) 3,975Frw
- d) 1,455Frw

- 15) A company wants to analyze the relationship between customer satisfaction and different product categories. They conducted a survey among their customers and recorded the following data:

	Category A	Category B	Category C
Satisfied	120	80	50
Neutral	50	60	40
Dissatisfied	30	40	70

Using the data above, answer the following questions:

- What is the probability that a customer is satisfied? **(2 marks)**
- What is the probability that a customer is satisfied given that they purchased from Category C? **(3 marks)**
- What is the probability that a customer is satisfied given that they purchased from Category C? **(3 marks)**

Section B: Attempt any three (3) questions (45 marks).

- 16) a) From the following data compute Laspeyre's index number for the current year. **(8 marks)**

Items	Base year		Current year	
	Price in Frw	Quantity in Kg	Price in Frw	Quantity in Kg
A	100	6	500	8
B	200	7	400	7
C	300	8	300	6
D	400	9	200	5

- b) A furniture dealer has to buy chairs and tables and he has total available money of \$50,000 for investment. The cost of a table is \$2500, and the cost of a chair is \$500. He has storage space for only 60 pieces, and he can make a profit of \$300 on a table and \$100 on a chair. Express this as an objective function and also find the constraints. **(7 marks)**

- 17) The mean and variance of 8 observations are 9 and 9.25 respectively. If six of the observation are 6,7,10,12,12,15, find the remaining two observations. **(15 marks)**
- 18) a) Use matrices to solve the following simultaneous equation: $\begin{cases} 2x - 3y = -8 \\ 5x + y = -3 \end{cases}$ **(8 marks)**
- b) Find the mean and variance of the following data: 6,7,8,9,10. **(7 marks)**
- 19) a) The total cost of commodity is given by the total cost function $C = \frac{25}{Q} + 0.1Q^2$. Find the value of Q that will minimize the total cost. Prove that for this value, the minimum cost occurs, and find that minimum total cost. **(10 marks)**
- b) Find the value of x that verifying the following equation: $8^{x+1} + 8^x = 9$ **(5 marks)**
- 20) Given the logarithmic function $f(x) = -1 + \ln(x + 1)$
- a) Find out the domain and range of $f(x)$. **(3 marks)**
- b) Find the equation of asymptote lines (if any)? **(3 marks)**
- c) Find the x - intercept and y - intercept. **(6 marks)**
- d) Determine another point belonging to the Graph of $f(x)$ and sketch that graph. **(3 marks)**

Space in which to answer the three chosen questions from Section B.

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