REPUBLIC OF RWANDA



Ministry of education

Western province

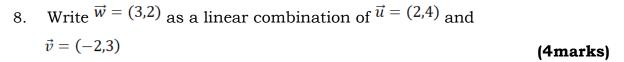
RUSIZI District /GS Saint Pierre NKOMBO

HOLIDAY PACKAGE OF CORE MATHEMATICS

SUBMISSION: First day of term 1/2025-2026 SECTION A/55MARKS

- Convert 20 grades to radians marks)
- 2. Consider the predicate p(x,y): "y = x + 3". What are the truth values of the propositions p(1,2) and p(0,3) (3 marks)
- 3. Study the parity of the following function $g(x) = x(x^2 + x)$ (3 marks)
- Robet's father is 4 times as old as Robert. After 5 years, father will be three times as old as Robert. Find their present ages.
 marks)
- 5. Discuss about the solution of the equation $\frac{m}{x-1} = \frac{3m-4}{x-2}$ (3marks)
- 6. Use completing of the square to solve $x^2 7x + 5 = -5$ (4 marks)
- 7. Find the equation of the tangent and the equation of the normal to the curve $f(x) = x^2 4x + 6$ at x = 6 (4 marks)

(3



9. Find the image of point B(5,4) by rotation of centre (2,1) and angle $^{45^0}$ (4marks)

10. Find derivative of
$$f(x) = \frac{3x^3 + 1}{x^2 + 4}$$
 (4 marks)

11. Given that log 2 = 0.30, log 3 = 0.48 and log 5 = 0.69. Calculate

(a)
$$log 150$$

marks)

(b)
$$log 0.2 + log 10$$
 (2 marks)

12. Construct the Cayley table for the operation * defined by $x * y = 2x^2 - 3y$ in set $A = \{0,2,4,6,8\}$. Use that table to solve

(a)
$$x * 4$$

marks)

(b)
$$3 * x$$

marks)

13. Solve in set of real number
$$\sqrt{x-1} = \sqrt{2x+1}$$
 (4 marks)

14. Evaluate the following limits:

a)
$$\lim_{x \to -\infty} \frac{3x}{\sqrt{9x^2 - 3x + 6}}$$
 (2

marks)

b)
$$\lim_{x\to 1} \frac{\sqrt[3]{x-1}}{x-1}$$
 (2

marks)

15.Determine all the numbers c which satisfy the conclusions of the Mean Value Theorem for the function $f(x) = x^3 + 2x^2 - x$ on [-1,2] (4 marks)

SECTION B: ATTEMPT ONLY ALL QUESTIONS (75 Marks)

16. Given the vectors $\vec{u} = (2, k)$ and $\vec{v} = (3, -2)$, Calculate the value of k so that the vectors \vec{u} and \vec{v} are:

(b) (a) perpendicular

(5marks)

(c) (b)parallel

(5marks)

(d) (c)make an angle of 60° .

(5marks)

$$f(x) = \begin{cases} \frac{x^2 + 2x - 3}{x + 3} & \text{if } x \neq -3\\ k & \text{if } x = -3 \end{cases}$$
17.(a) Given the function

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Determine the value of k for which the function is continuous at x = -3(5marks)

- (e) Discuss the parametric equation: $(10 \beta)x^2 6x + \beta = 0$ (7 marks)
- (f) Transform in simple radical $\sqrt{5+2\sqrt{6}}$ (3marks)
- 18. a) Solve in the set of real numbers: $2x^4 7x^3 + 10x^2 7x + 2 = 0$ (10marks)
 - b) Simplify completely: $\frac{\frac{3log\sqrt{2}+log24-log3}{\frac{13}{2}log64-log128^{-1}}}{}$ (5marks)

19 a) A person standing on the bank of a river observes that the angle subtended by a tree on the opposite bank is 45°. When he retreats 50 metres from the bank, he finds the angle to be 30° .

Find the breadth of the river and the height of the tree. (9marks)

b) Suppose your parents invest 10,000 FRW in a savings account for college at the time you are born. The average interest rate is 4% and is compounded quarterly. How much money will be in the college account when you are 18 years old? (6marks)

$$20.\text{Let } f(x) = \frac{-3x^2 + 2}{x - 1}$$

- a. Determine the domain of definition of f(x) (1marks)
- b. Calculate the limits around the domain of definition and deduce the equations of the asymptotes to the curve of f(x) (4marks)
- c. Study the variation sense of f(x) and draw the variation table (5marks)
- d. Determine the coordinates of the points of intersection of the curve with axis coordinates.

(2marks)

e. Sketch the graph of f(x)

(3marks)

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