الجامعة الوطنية
National University
Science & Technology للعلوم والتكنولوجيا
كلية عمان البحرية الدولية
International Maritime College Oman

ACADEMIC YEAR 2023 - 2024

Program	Semester	Term	Paper
FOUNDATION	1	2	MIDTERM

MODULE NAME:	**BASIC MATHEMATICS II**		
MODULE CODE:	**FMTH004**	**EXAM DATE:**	**03/01/2024**
INSTRUCTOR's NAME:	**Muhammad Kazam**	**DURATION:**	**$1\frac{1}{2}$ hrs.**

Questions to be answered on:	**Allowed tools:**	**Number of pages**
✓ Space provided on the question paper	Pen, Pencil & Calculator	(Incl. cover page)**:** **07**

Points of attention:

- For each question, the maximum earned points are mentioned between brackets at the end of each question.
- Write very clearly! Answers that are not readable are not marked and don't get points!
- Make sure your answers are written to the point.
- All answers must be written **in English**.
- Write all the answers **in blue or black pen only**.
- When finished, submit the question paper, together with the answer scripts and the signed cover page to the invigilator.
- Cheating / copying is not allowed and will result in failing the exam.

STUDENT NAME:	
STUDENT ID:	
CLASS:	

FINAL MARKS

20

Number of answer scripts:……..…….

Invigilator:……..……..

Student's signature: ……

Time of receipt:……..…..

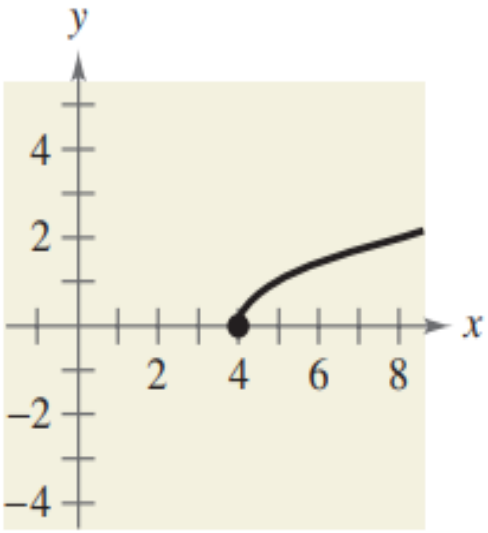
Question 1 [2 Marks]

Use the discriminant to determine the number of real solutions of the following equation. Do not solve.

$$4x^2 + 5x - \frac{13}{4} = 0$$

Question 2 [1 Mark]

The following graph is symmetric with respect to *x*-axis. Complete the graph using the symmetry.



(Sullivan, 2018)

Question 3 [4 Marks]

Show that the equation given below represents a circle and find the center and radius of the circle.

$$x^2 + y^2 - 9x = 7 - 4y$$

Question 4 [4 Marks]

Solve linear inequality. Express the solution using interval notation and graph the solution set.

$$\frac{1}{3} \leq \frac{5-2x}{3} \leq \frac{1}{2}$$

Question 5 [5 Marks]

Find all real solutions of the following equation.

$$\frac{x}{2x+7} - \frac{x+1}{x+3} = 1$$

Question 6 [4 Marks]

The electricity bill cost (C) of a customer varies between OMR. 50 and OMR. 90. The bill is made up of a charge of OMR. 10 and a cost of 200 baisas per kilowatt hour of electricity. Write down an inequality and calculate the range of kilowatt hour. ($OMR.1 = 1000\ baisas$)

Formula Sheet

$(A+B)(A-B) = A^2 - B^2$
$(A+B)^2 = A^2 + 2AB + B^2$
$(A-B)^2 = A^2 - 2AB + B^2$
$(A+B)^3 = A^3 + 3A^2B + 3AB^2 + B^3$
$(A-B)^3 = A^3 - 3A^2B + 3AB^2 - B^3$
$A^3 + B^3 = (A+B)(A^2 - AB + B^2)$
$A^3 - B^3 = (A-B)(A^2 + AB + B^2)$

Quadratic formula: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

Distance formulas: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

MLO & Bloom's Level of Complexity

Q #	MLO Addressed	Complexity Level	Mark	Remark
1	**2**	Understanding/ Application	**2**	Expect 100% to solve
2	**5**	Understanding	**1**	Expect 100% to solve
3	**4**	Application	**4**	Expect 90% to solve
4	**1**	Understanding/ Application	**4**	Expect 80% to solve
5	**2**	Understanding/ Application	**5**	Expect 60% to solve
6	**3**	Application	**4**	Expect 80% to solve

Reference:

Sullivan, M. (2018). *Precalculus* (10th ed.). Pearson.