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

FINAL EXAM
FMTH004: BASIC MATHEMATICS - II
Fall-T2 2024-25

Points of attention:

- For each question, the maximum earned points are specified in the question.
- Write clearly! Answers that are not readable are not marked and don't earn marks!
- All answers should be written in English using **blue or black pens** only.
- Use the pencil only for diagrams and graphs.
- Show all the calculation steps in the given space.
- When finished, submit and sign the question paper to the invigilator.
- Any cheating/copying may result in an instant failing of the examination.

Exam Duration:	**2 hours**
Instructor's Name:	**Khaloud Al Ajmi**
Exam Date:	**09/02/2025**
Program:	**FND**

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Student Information			
Name:		ID:	
Signature:			

Invigilator			
Initials:		☐ Student ID checked	
Time received:			

Question 1. Find the values of the trigonometric ratios of θ from the given information.

$\cos\theta = \frac{2}{5}$, $\sin\theta < 0$ **[7 Marks]**

Question 2. Find the exact values of the following trigonometric functions.

[6 Marks]

a. $\sin(-30)°$ **(3 marks)**

b. $\sec 120°$ **(3 marks)**

Question 3. A kite is flying at a height of 50m , and the string attached to it makes an angle of 60° with the ground. How long is the string? [4 Marks]

Question 4. A sector of a circle with a radius of 50 cm has an area of 500 cm^2. Find the central angle of the sector in radians and degrees. [4 Marks]

Question 5. Determine whether the following lines are parallel, perpendicular, or neither.
[6 Marks]

a. $y = \frac{1}{2}x + 4 \quad ; \quad 2x + 4y = 1$ **(3 marks)**

b. $-3x + 4y = 4 \quad ; \quad 4x + 3y = 5$

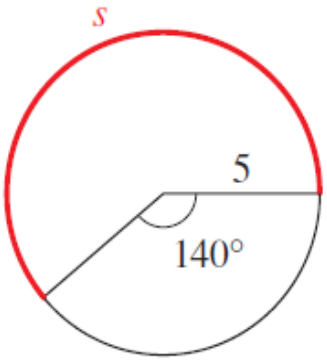
(3 marks)

Question 6. Which of the points $A(6,7)$ or $B(-5,8)$ is closer to the origin? [4 Marks]

Question 7. Test the following equation for symmetry. **[4 Marks]**

$x = y^4 - y^2$

Question 8. Find the length *s* in the circular arc given below. **[5 Marks]**



Formula Sheet

Equation of circle $(x-a)^2+(y-b)^2=r^2$	$Slope = m = \frac{y_2 - y_1}{x_2 - x_1}$
Distance formula $d = \sqrt{(x_2-x_1)^2)+(y_2-y_1)^2)}$	$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

Trigonometric Table

$\boldsymbol{\theta}°$	$\boldsymbol{\theta}$ $(\boldsymbol{rad})$	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\csc\theta$	$\sec\theta$	$\cot\theta$
0	**0**	0	1	0	$undefined$	1	$undefined$
30°	$\frac{\boldsymbol{\pi}}{\boldsymbol{6}}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
45°	$\frac{\boldsymbol{\pi}}{\boldsymbol{4}}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\frac{\boldsymbol{\pi}}{\boldsymbol{3}}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$
90°	$\frac{\boldsymbol{\pi}}{\boldsymbol{2}}$	1	0	$undefined$	1	$undefined$	0