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

Final Exam
FMTH004: BASIC MATHEMATICS-II
Fall-T1 2024

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.

Exam Duration: 2 hours
Instructor's Name: Muhammad Kazam Razaq
Exam Date: 17/11/2024
Program: FND

	40
	10

Student Information

Name: _____ ID: _____

Signature: _____

Invigilator

Initials: _____ ☐ Student ID checked

Time received: _____

Question 1. **[5 marks]**

State whether each statement is True or False.

a. If $b^2 - 4ac = 0$, then the equation has exactly 2 real solutions. _____

b. The x- intercept of the equation $x^2 - xy = 4$ is 2 and -2. _____

c. The slope of a line parallel to the line $3x - y = 6$ is 3. _____

d. In a right triangle with θ as one of its acute angles, $\cos\theta = \frac{Opposite}{Adjacent}$ _____

e. If $sec\,\theta < 0$ and $sin\,\theta > 0$, then θ lies in the Ⅱ quadrant. _____

Question 2. **[5 marks]**

Circle the correct option to fill in the blanks.

1. The standard form of the quadratic equation $2x^2 = 5 - 7x$ is _____.

a. $2x^2 - 7x + 5 = 0$ **b.** $2x^2 - 5 - 7x = 0$ **c.** $2x^2 + 7x - 5 = 0$ **d.** $2x^2 + 7x + 5 = 0$

2. The solution of the inequality $2x - 5 > 3$ is _____.

a. $[-4, 4]$ **b.** $(-4, 4)$ **c.** $(4, \infty)$ **d.** $(-\infty, 4)$

3. If two sides of a triangle are equal, it is called as _____ triangle.

a. equilateral **b.** right **c.** isosceles **d.** scalene

4. The center of the circle $(x + 3)^2 + (y - 4)^2 = 25$ is _____.

a. $(3, -4)$ **b.** $(-3, 4)$ **c.** 5 **d.** -5

5. The angle that is coterminal with the angle $40°$ is _____.

a. $140°$ **b.** $-220°$ **c.** $50°$ **d.** $320°$

Question 3. **[2 marks]**

Calculate the radian measure as a multiple of π of the angle $240°$.

Question 4. **[3 marks]**

A sector of a circle has a central angle of $45°$. Find the area of the sector if the radius of the circle is 8 cm.

Question 5. **[5 marks]**

Find all real solutions of the equation given below by using the quadratic formula.

$5x^2 + 3x = 2$

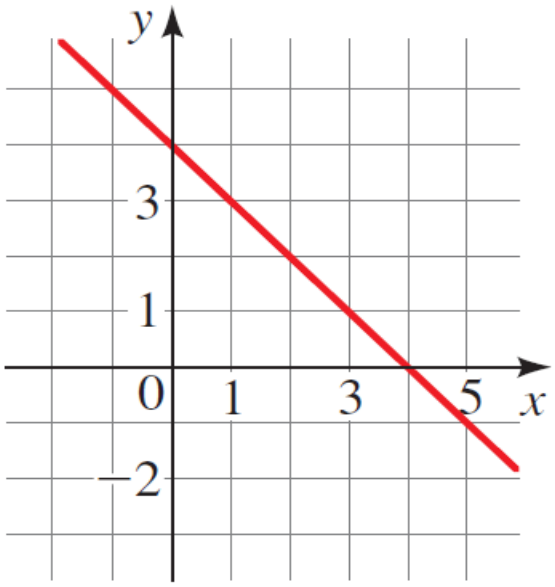
Question 6. **[4 marks]**

Determine whether the two lines determined by the points given below are parallel or perpendicular.

$(-2, 3), (1, 7)$ and $(2, 4), (6, 1)$

Question 7. **[3 marks]**

Find an equation for the line whose graph is sketched.



(Stewart, Redlin and Watson, 2017)

Question 8. **[4.5 marks]**

Test the equation given below for symmetry.

$x^2 - 4xy^2 = 3$

Question 9. **[4.5 marks]**

Sketch a triangle that has acute angle θ, and find the other five trigonometric ratios of θ.

$\cos\theta = \frac{12}{13}$

Question 10. **[4 marks]**

You are considering two job offers. The first job pays $3000 per month plus a commission of 3% of your gross sales. The second job pays $1000 per month plus a commission of 5% of your gross sales. Write an inequality yielding the gross sales per month for which the second job will pay the greater monthly wage.

Formula Sheet

$$(A+B)(A-B) = A^2 - B^2 \qquad (A+B)^2 = A^2 + 2AB + B^2$$

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

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

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

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

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

Reference:

Stewart, J., Redlin, L. and Watson, S. (2017) *Precalculus Mathematics for Calculus*. 7th edn. Cengage.