ACADEMIC YEAR 2023 – 2024

Program	Term	Semester	Paper
FOUNDATION	1	1	MAIN

MODULE NAME:	BASIC MATHEMATICS I		
MODULE CODE:	FMTH003	EXAM DATE:	20/11/2023
TEACHER'S NAME:	Khaloud Al Ajmi	DURATION:	2 hrs.

Questions to be answered on:	Allowed requirements	Number of pages
Space provided on the question paper	Pen Pencil (only for drawing)	(Incl. Cover Page): 08

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.
- Any cheating/copying may fail the examination.

STUDENT NAME:	
STUDENT ID:	
CLASS:	

FINAL MARKS
40

Number of answer scripts: ……

Invigilator: …….....

Student's signature: ……

Time of receipt: …….....

Question 1 [10 Marks]

Circle the correct option to fill in the blanks.

Example. 85 is a _____ digit number.			
a 1	**b** 2	**c** 3	**d** 4
1. If $B = [3,6]$, and $C = (-\infty, 4)$. Find $B \cap C$.			
a $\emptyset$	**b** $(-\infty, 4)$	**c** $[3, 4)$	**d** $[3, 4)$
2. The cummtative property of addition to solve $x + 3 =$ _____.			
a $3 + x$	**b** $x + 3$	**c** $x3$	**d** $3x$
3. $0.061\ kg =$ _____ g			
a 0.000061	**b** 0.0061	**c** 61	**d** 6.1
4. 3π is _____ number.			
a a rational	**b** a whole	**c** a natural	**d** an irrational
5. The degree of the polynomial $x^3 - 3x^7 + 1$ is _____.			
a 0	**b** 7	**c** 3	**d** 4
6. The simplified form of the algebraic expression $(3y + 5)(3y - 5)$ is _____.			
a $9y - 25$	**b** $3y + 25$	**c** $9y^2 - 25$	**d** $9y^2 + 25$
7. The factors of trinomial $x^2 - 4x - 12$ _____.			
a $(x + 2)(x + 6)$	**b** $(x + 2)(x - 6)$	**c** $(x - 2)(x + 6)$	**d** $(x - 2)(x - 6)$
8. $3 - \frac{3}{4} =$ _____.			
a $\frac{3}{4}$	**b** $\frac{3}{8}$	**c** 0	**d** $\frac{9}{4}$
9. $a(b + c) = ab + ac$ follows the _____ property.			
a associative	**b** additive	**c** inverse	**d** distributive
10. $(27)^{\frac{2}{3}} =$ _____.			
a 6	**b** 9	**c** 3	**d** 27

Question 2 [6 Marks]

Simplify the following algebraic expressions.

a. $(1-2r)^3$ **(3 marks)**

b. $2(2-3t-t^2)+t^2(t+2)-t(t^2+5t-1)$ **(3 marks)**

Question 3 [5 Marks]

Find the quotient and remainder using synthetic division.

$$\frac{3x^3+7x^2-x-7}{x+5}$$

Question 4 [5 Marks]

Simplify the below rational expression.

$$\frac{x+3}{4x^2-9} \times \frac{2x^2+7x-15}{x^2+7x+12}$$

Question 5 [3 Marks]

If $A = \{x \mid x < 4\}$ and $B = \{x \mid -1 < x \leq 5\}$, then find the set $\boldsymbol{A \cap B}$.

Question 6 [4 Marks]

The melting point of the element Sulphur is 115℃. Find the melting point in degree Fahrenheit.

Question 7 [3 Marks]

A drop of water contains more than 29 billion molecules. Express this number in scientific notation.

Question 8 [4 Marks]

Solve the following equation.

$\frac{2}{3}y + \frac{1}{2}(y - 3) = \frac{y+1}{4}$

Units Conversion Table

$1\ km = 1000\ m$	$1\ m = 100\ cm$
$1\ cm = 10\ mm$	$1\ kg = 1000\ g$
$1\ g = 1000\ mg$	$1\ l = 1000\ ml$
$1\ tonne = 1000kg$	$1\ cm^3 = 1\ ml$
$1\ foot = 12\ inches$	$1\ yard = 3\ feet$
$1\ mile = 1760\ yards$	$1\ gallon = 8\ pints$
$F = \frac{9}{5}\ C + 32$	$C = \frac{5}{9}(F - 32)$

Algebraic Formulas

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

References:

Larson, R. and Hostetler, R. (2007) *Precalculus*. 7th edn. Boston: Houghton Mifflin Company.

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