

ACADEMIC YEAR 2023 – 2024

Program	Year	Semester	Paper
LTM	1	1	MAIN

MODULE NAME:	ARITHMETICS I
---------------------	----------------------

MODULE CODE:	PMATH-I-I	EXAM DATE:	31.12.2023
---------------------	------------------	-------------------	-------------------

TEACHER'S NAME:	Dr Yaqoob Al Rahbi	DURATION:	120 Min.
------------------------	---------------------------	------------------	-----------------

Questions to be answered on:	Allowed requirements	Number of pages
Space provided on the question paper	Pen, Calculator & Pencil (only for drawing)	(Incl. Cover Page): 8

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.

		FINAL MARKS
STUDENT NAME:	<input type="text"/>	
STUDENT ID:	<input type="text"/>	
CLASS:	<input type="text"/>	40

Number of answer scripts:

Invigilator:

Student's signature:

Time of receipt:

1) Solve the nonlinear system

[8 Marks]

$$y = x^2$$

$$3x - y = 2$$

- 2) A manufacturer of a product sells all that is produced. The total revenue is given by $Y_{TR} = 9.5q$, and the total cost is given by $Y_{TC} = 9q + 500$, where q represents the number of units produced and sold. **[8 Marks]**
- Find the level of production at the break-even point.
 - Find the level of production at profit is 2000.

- 3) Suppose that over a six-year period, \$1000 accumulated to \$1959 in an investment certificate in which interest was compounded quarterly. Find the nominal rate of interest, compounded quarterly, that was earned. Round your answer to two decimal places. **[6 Marks]**

- 4) A debt of \$7500 due in five years and \$2500 due in seven years is to be repaid by a [6 Marks]
single payment now. Find how much the payment is if the interest rate is 4%
compounded quarterly.

5) If $A = \begin{pmatrix} 1 & 2 \\ 0 & -1 \\ 7 & 0 \end{pmatrix}$ and $D = \begin{pmatrix} 1 & 2 & -1 \\ 1 & 0 & 2 \end{pmatrix}$, then find the following:

[6 Marks]

- $3A + D^T$
- $(D - 2A^T)^T$

6) Solve the following system by the method of reduction.

[6 Marks]

$$x - 3y = -11$$

$$4x + 3y = 9$$

Formula Sheet

$$1) S = P(1 + r)^n$$

$$2) P = S(1 + r)^{-n}$$

$$3) S = Pe^{rt}$$

$$4) A = R \cdot \frac{1 - (1 + r)^{-n}}{r}$$

$$5) x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$6) Y_{TC} = Y_{VC} + Y_{FC}$$

$$7) \text{Profit} = Y_{TR} - Y_{TC}$$