α-MATHEMATICS

Grade 10 Alpha Mathematics

Term 1 Test 2021

Examiner: L Liebenberg **Time: 1 hour**

Moderator: R Grobler **Total: 50**

INSTRUCTIONS AND INFORMATION

Read through the following instructions before answering the question paper.

1. This question paper consists of 5 pages and an answer sheet.
2. Answer ALL 5 questions.
3. Number the answers according to the numbering system used in this question paper.
4. Non-programmable calculators may be used, unless otherwise indicated in the question.
5. Unless indicated otherwise, all answers, where necessary, must be given correct to two decimal places.
6. Cleary show all calculations, diagrams, graphs etcetera that you have used in determining the answers.
7. Answers only will not necessarily be awarded full marks.
8. The diagrams are not necessarily drawn to scale.
9. All angles are given in radians. Answers must also be given in radians where necessary.
10. Write neatly and legibly.

Question 1 [10 marks]

This question must be answered **on the answer sheet**.
Every question has **ONLY** one correct answer for TWO marks each. Mark the correct answer with an **X** on the answer sheet.

1.1 $-3i =$

A $-3i^3$

B $\frac{3}{i}$

C $-\frac{3}{i}$

D $-\frac{i}{3}$

1.2 If $\frac{7x+1}{x^3+x^2}$ is decomposed into partial fractions, it will be in the form:

A $\frac{A}{x^3}+\frac{B}{x^2}$

B $\frac{Ax+B}{x^3+x^2}$

C $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x+1}$

D $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x^3}$

1.3 $i^{207} =$

A $-i$

B i

C 1

D -1

1.4 Matrix $A = \begin{bmatrix} 3 & 9 \\ 1 & 2 \\ 7 & 0 \end{bmatrix}$ has dimension 3×2 this means that

A It is a square matrix.

B There are 3 columns and 2 rows.

C All of the elements equals 3 and 2.

D There are 3 rows and 2 columns.

1.5 $\begin{pmatrix} 0 & 3 \\ 1 & 4 \\ 2 & 5 \end{pmatrix}\begin{pmatrix} 2 & 4 & 6 \\ 3 & 5 & 7 \end{pmatrix} =$

A Not possible

B $\begin{pmatrix} 9 & 15 & 21 \\ 14 & 24 & 34 \\ 19 & 33 & 47 \end{pmatrix}$

C Zero

D $\begin{pmatrix} 2 & 6 \\ 5 & 9 \\ 8 & 12 \end{pmatrix}$

Question 2 **[13 marks]**

Given $m = 3 + 2i$ and $n = -2 - i$.

2.1 Write down the conjugate of m, that is m^*. (1)

2.2 Determine the sum of m and n graphically. (Make use of the answer sheet.) (5)

2.3 Calculate $m.n$ (3)

2.4 Calculate $\frac{m}{m^*}$ (4)

Question 3 **[9 marks]**

Decompose $\frac{6x^2+17x+13}{(x+2)^2(x-1)}$ into partial fractions, show all steps.

Question 4 **[10 marks]**

Given the system of equations:

$$3x + y - z = 5$$
$$6x + 2z = 4$$
$$2y + 3z = 9$$

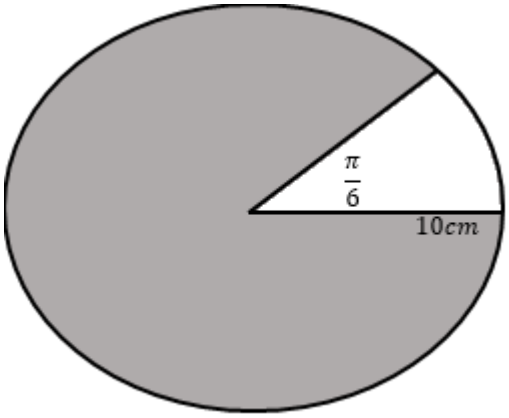
4.1 Write the system of equations as a matrix in the form $Ax = b$. (3)

4.2 Calculate the determinant of matrix A in question 4.1. (5)

4.3 Given that the value of the determinant $A_y = -162$, calculate the value of y. (2)

Question 5 **[8 marks]**

Given the circle with a radius $10\ cm$. The sector has an angle of $\frac{\pi}{6}\ radians$ and an arc length of $x\ cm$.



5.1 Determine the value of x to TWO decimal places. (3)

5.2 Determine the area of the shaded part of the circle to the nearest integer value. (5)

- END OF PAPER -

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Term 1 Test 2021 Answer sheet

Name and Surname: _____

Question Total	1 [10]	2 [13]	3 [9]	4 [10]	5 [8]	TOTAL 50
Learner mark						

Question 1

1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D
1.4	A	B	C	D
1.5	A	B	C	D

2.2