α-MATHEMATICS

Grade 11 Alpha Mathematics

Term 1 Test 2023

Examiner: Lanice Liebenberg **Time: 1 hour**

Moderator: Rika Grobler **Total: 60**

INSTRUCTIONS AND INFORMATION

Read through the following instructions before answering the question paper.

1. This question paper consists of 5 pages, an answer sheet and a diagram 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. Mark the correct answer with an **X** on the answer sheet.

1.1 Which property with regard to absolute values is not true? (2)

A $|a| = |-a|$

B $|a| = \sqrt{a^2}$

C $|a|$ can be equal to zero

D $|a| < 0$

1.2 If $x - 2$ is a factor of $f(x)$, then (2)

A $f(2) = 0$

B $f(0) = 2$

C $f(-2) = 0$

D $f(0) = -2$

1.3 Given $g(x) = x^3 + 1 = 0$ the roots of g will be as follows: (2)

A 3 real roots

B 1 real root and 2 complex roots

C only 1 real root

D 3 complex roots that are not real

1.4 If $|y| \leq 0$ then: (2)

A There are no solutions for y.

B $y \in \mathbb{R}$

C y has one solution only

D $y \in \mathbb{R}$; $y \neq 0$

1.5 Which number will be in the 9th position in the 14th row of Pascal's triangle? (2)

A 1287

B 3003

C 715

D 2002

Question 2 **[27 marks]**

2.1 Solve for x:

2.1.1 $|x+2|<0$ (2)

2.1.2 $|2x+6|\geq 10$ (4)

2.1.3 $6|x-5|+10<20-4|5-x|$ (4)

2.1.4 $|2x+1|=-x-5$ (7)

2.2 Given $y=-|8+x|-4$

2.2.1 Write down the coordinate of the salient point. (2)

2.2.2 Calculate the y-intercept. (2)

2.2.3 Determine the x-intercepts. (2)

2.2.4 Sketch the graph of y on the DIAGRAM SHEET. (4)

Question 3 **[7 marks]**

Decompose

$$\frac{2x^2+23x+11}{(x+5)(x^2+2)}$$

into partial fractions.

Question 4 **[10 marks]**

Given $f(x)=x^4+7x^3+14x^2+2x-12$ and $x=-1+\sqrt{3}$ factorise f fully in $\mathbb{R}$

Question 5 [6 marks]

Given the Binomial Theorem

$$(a+b)^n = \sum_{r=0}^{n} \binom{n}{r} a^{n-r}b^r$$
$$= \binom{n}{0}a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \cdots + \binom{n}{n-1}ab^{n-1} + \binom{n}{n}b^n$$

Determine the coefficient of x^6 in the expansion of $\left(-2x - \frac{2}{x}\right)^8$.

- END OF QUESTION PAPER -

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Term 1 Test 2023 Answer sheet

Name and Surname: _____

Question Total	1 [10]	2 [27]	3 [7]	4 [10]	5 [6]
Learner mark					

TOTAL 60

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

Question 2

2.2.4