

α -MATHEMATICS

Grade 11 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 4 pages and an answer sheet.
2. Answer ALL 4 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. Clearly 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**[19 marks]**

- 1.1 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.

1.1.1 The roots of the equation $|2x + 8| = -4$ are: (1)

- A Non real
- B $x = -6$ or $x = -2$
- C $x = 2$ or $x = 6$
- D No Solutions

1.1.2 The salient point of the graph $y = |2x + 10| - 3$ is: (2)

- A (10 ; -3)
- B (-10 ; -3)
- C (5 ; -3)
- D (-5 ; -3)

1.2 Solve for x if: (5)

$$\frac{9}{|x - 1|} \geq 3$$

1.3 Given $g(x) = -|x + 4| + 1$

1.3.1 Determine $g(0)$. (2)

1.3.2 Write down the coordinates of the salient point. (2)

1.3.3 Determine the value(s) of x for which $g(x) = 0$. (3)

1.3.4 This question must be answered **on the answer sheet**.
Sketch the graph of g . (4)

Question 2**[9 marks]**

- 2.1 This question must be answered **on the answer sheet**.
There is **ONLY** one correct answer. Mark the correct answer with an **X** on the answer sheet.

If $\frac{7x+9}{x^3+x^2}$ is decomposed into partial fractions it will have the form: (2)

- A** $\frac{A}{x^3} + \frac{B}{x^2}$
B $\frac{A}{x^3} + \frac{B}{x^2} + \frac{C}{x}$
C $\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x+1}$
D $\frac{A}{x^2} + \frac{Bx+C}{x+1}$

- 2.2 Decompose $\frac{-2x^2+3x-2}{x^3+x}$ into partial fractions. (7)

Question 3**[11 marks]**

Given $f(x) = x^4 - x^3 - 3x^2 + 55x - 52$

- 3.1 Show that $x = 1$ is a zero of $f(x)$. (1)
3.2 Given that $2 + 3i$ is a zero of $f(x)$, determine a quadratic factor of f . (3)
3.3 Factorise $f(x)$ fully in \mathbb{C} . (7)

Question 4**[11 marks]**

4.1 Given rows 7 to 10 of Pascal's triangle below:

		1	6	15	20	15	6	1		
	1	7	21	35	a	21	7	1		
	1	8	28	56	b	56	28	8	1	
1	9	36	84	126	126	84	36	9	1	

4.1.1 Determine the values of **a** and **b**.

(2)

4.1.2 What will the value of the number be that is in the 12th place of row 20?

(3)

4.2 Given the Binomial theorem:

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

Determine the coefficient of x^5 if $(2x + 3y)^{12}$.

(6)

- END OF QUESTION PAPER -

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Grade 11 Alpha Mathematics Term 1 Test 2021 Answer sheet

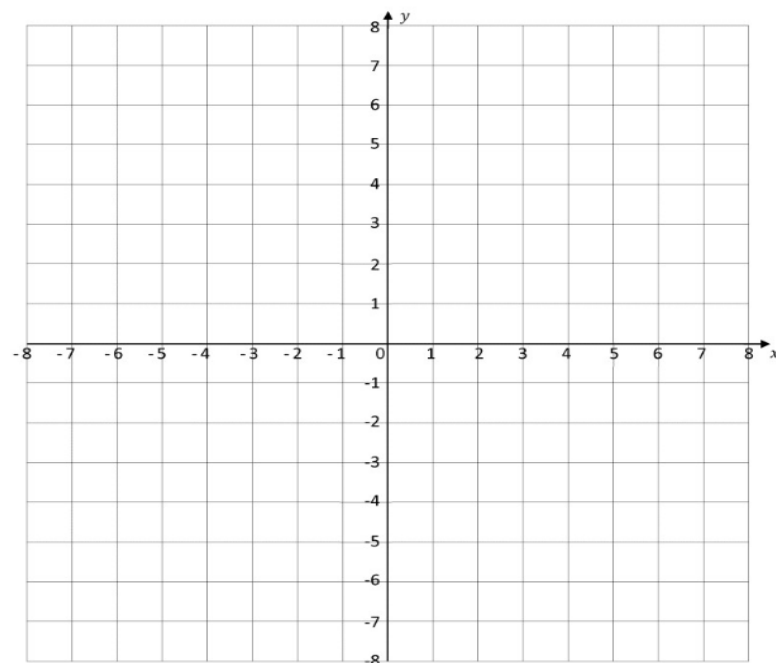
Name and Surname: _____

Question Total	1 [19]	2 [9]	3 [11]	4 [11]	TOTAL 50
Learner mark					

Question 1

1.1.1	A	B	C	D
1.1.2	A	B	C	D

1.3.4



Question 2

2.1	A	B	C	D
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