

α -MATHEMATICS

Alpha Wiskunde Graad 11 / *Alpha Mathematics Grade 11*

Termyn 1 Toets 2023 / *Term 1 Test 2023*

MEMORANDUM

Totaal / *Total*: 60 punte / *marks*

Eksaminator / *Examiner*: Lanice Liebenberg

Moderator: Rika Grobler

Hierdie memorandum bestaan uit 6 bladsye. /

This memorandum consists of 6 pages.

Vraag / Question 1

[10 punte / marks]

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

NR. NO	ANTWOORD ANSWER	BEREKENINGE (nie vir nasien doeleindes nie) CALCULATIONS (not for marking purpose)	PUNTE MARKS
1.1	D	$ a < 0$	(2)
1.2	A	$f(2) = 0$	(2)
1.3	B	$x = -1; -1 \pm \sqrt{3}i$ 1 real root and 2 complex roots	(2)
1.4	C	$y = 0$ y has one solution only	(2)
1.5	B	$\binom{14}{8} = 3003$	(2)

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
2.2.4		<p>(4)</p> <ul style="list-style-type: none"> ✓ salient point ✓ y-intercept ✓✓ shape

Vraag / Question 3

[7 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
	$\frac{2x^2 + 23x + 11}{(x + 5)(x^2 + 2)} \equiv \frac{A}{x + 5} + \frac{Bx + C}{x^2 + 2} \checkmark$ $2x^2 + 23x + 11 = A(x^2 + 2) + (Bx + C)(x + 5) \checkmark$ <p>Let $x = -5$</p> $2(-5)^2 + 23(-5) + 11 = A((-5)^2 + 2)$ $-54 = 27A$ $A = -2 \checkmark$ $2x^2 + 23x + 11 = Ax^2 + 2A + Bx^2 + 5Bx + Cx + 5C \checkmark$ $A + B = 2 \quad \text{and} \quad 2A + 5C = 11$ $-2 + B = 2 \quad \quad \quad 2(-2) + 5C = 11$ $B = 4 \checkmark \quad \quad \quad C = 3 \checkmark$ $\frac{2x^2 + 23x + 11}{(x + 5)(x^2 + 2)} \equiv \frac{-2}{x + 5} + \frac{4x + 3}{x^2 + 2} \checkmark$	(7)

Vraag / Question 4

[10 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
	<p>If $x = -1 + \sqrt{3}$ is a root then so is $x = -1 - \sqrt{3} \checkmark$</p> $(x + 1 - \sqrt{3})(x + 1 + \sqrt{3})$ $= x^2 + 2x - 2 \checkmark \checkmark$ <p>Through long or synthetic division</p> $(x^4 + 7x^3 + 14x^2 + 2x - 12) \div (x^2 + 2x - 2) = (x^2 + 5x + 6) \checkmark \checkmark \checkmark$ $f(x) = x^4 + 7x^3 + 14x^2 + 2x - 12$ $f(x) = (x^2 + 2x - 2)(x^2 + 5x + 6) \checkmark$ $f(x) = (x + 1 - \sqrt{3})(x + 1 + \sqrt{3}) \checkmark (x + 2) \checkmark (x + 3) \checkmark$	(10)

Vraag / Question 5

[6 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
	$(a + b)^n = \binom{n}{r} a^{n-r} \cdot b^r$ $a = -2x \quad b = -\frac{2}{x} \quad n = 8$ $\left(-2x - \frac{2}{x}\right)^8 = \binom{8}{r} \cdot (-2x)^{8-r} \cdot \left(-\frac{2}{x}\right)^r \checkmark$ $= \binom{8}{r} \cdot (-2)^{8-r} \cdot x^{8-r} \cdot (-2)^r \cdot (x)^{-r} \checkmark$ $8 - r - r = 6 \checkmark$ $r = 1 \checkmark$ $\left(-2x - \frac{2}{x}\right)^8 = \binom{8}{1} \cdot (-2x)^{8-1} \cdot \left(-\frac{2}{x}\right)^1 \checkmark$ $= 2048x^6$ $2048 \checkmark$	<p>(6)</p>

- EINDE VAN DIE MEMORANDUM / END OF THE MEMORANDUM -