

# **$\alpha$ -MATHEMATICS**

**Alpha Wiskunde Graad 11 / *Alpha Mathematics Grade 11***

**Termyn 1 Toets 2021 / *Term 1 Test 2021***

## **MEMORANDUM**

**Totaal / *Total*: 50 punte / *marks***

**Eksaminator / *Examiner*: Lanice Liebenberg**

**Moderator: Rika Grobler**

**Hierdie memorandum bestaan uit 4 bladsye. /**

***This memorandum consists of 4 pages.***

Vraag / Question 1

[19 punte / marks]

1.1.1	A	B	C	D
1.1.2	A	B	C	D

NR. NO	ANTWOORD ANSWER	BEREKENINGE (nie vir nasien doeleindes nie) CALCULATIONS (not for marking purpose)	PUNTE MARKS
1.1.1	D	$ 2x + 8  = -4$	(1)
1.1.2	D	$(-5; -3)✓✓$	(2)

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
1.2	$\frac{9}{ x - 1 } \geq 3$ $9 \geq 3 x - 1 ✓$ $3 \geq  x - 1 $ $ x - 1  \leq 3✓$ $-3 \leq x - 1 \leq 3✓$ $-2 < x \leq 4$ $✓ \quad ✓$	(5)
1.3.1	$g(0) = - 0 + 4  + 1✓$ $= -3✓$	(2)
1.3.2	$(-4; 1)$	(2)
1.3.3	$0 = - x + 4  + 1$ $ x + 4  = 1✓$ $x + 4 = 1 \quad ; \quad x + 4 = -1$ $x = -3 \quad ✓ \quad ; \quad x = -5✓$	(3)

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
1.3.4		<ul style="list-style-type: none"> <li>✓ Salient Point / Knakpunt</li> <li>✓ y-intercept / y-afsnit</li> <li>✓ x-intercepts / x-afsnitte</li> <li>✓ Shape / vorm</li> </ul> <p style="text-align: right;"><b>(4)</b></p>

**Vraag / Question 2**

**[9 punte / marks]**

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS						
2.1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">A</td> <td style="width: 15%;">B</td> <td style="width: 15%; background-color: black; color: white;">C</td> <td style="width: 15%;">D</td> <td style="width: 15%;"></td> </tr> </table>		A	B	C	D		<p style="text-align: right;">✓✓ Answer(2)</p>
	A	B	C	D				
2.2	$\frac{-2x^2+3x-2}{x^3+x} \equiv \frac{-2x^2+3x-2}{x(x^2+1)}$ $\equiv \frac{A}{x} + \frac{Bx+C}{x^2+1}$ $-2x^2 + 3x - 2 \equiv A(x^2 + 1) + x(Bx + C)$ $-2x^2 + 3x - 2 \equiv Ax^2 + A + Bx^2 + Cx$ $C = 3 \quad A = -2 \quad A + B = -2$ $B = 0$	<ul style="list-style-type: none"> <li>✓ Factors / Faktore</li> <li>✓ Form / Vorm</li> <li>✓ Simplify / Vereenvoudig</li> <li>✓ Simplify / Vereenvoudig</li> <li>✓ C</li> <li>✓ A</li> <li>✓ B</li> </ul> <p style="text-align: right;"><b>(7)</b></p>						

Vraag / Question 3

[11 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
3.1	$f(1) = (1)^4 - (1)^3 - 3(1)^2 + 55(1) - 52$ $= 0 \checkmark$	(1)
3.2	$3i + 2 = 2 + 3i$ <p><i>is a zero, then so is / is 'n nulpunt asook <math>2 - 3i \checkmark</math></i></p> <p><i><math>(x - 2 - 3i)(x - 2 + 3i)</math> is a factor / is 'n faktor</i></p> $= x^2 - 4x + 4 - 9i^2$ $= x^2 - 4x + 13 \checkmark \checkmark$ <p>OR</p> $(x - 2)^2 = (\pm 3i)$ $x^2 - 4x + 4 = -9$ $0 = x^2 - 4x + 13 \checkmark \checkmark$	(3)
3.3	<p><i>Make use of long division to see that / Maak gerbuik van langdeling om te sien dat:</i></p> $(x^4 - x^3 - 3x^2 + 55x - 52) \div (x^2 - 4x + 13)$ $= (x^2 + 3x - 4) \checkmark \checkmark \checkmark$ $f(x) = x^4 - x^3 - 3x^2 + 55x - 52$ $= (x^2 - 4x + 13)(x^2 + 3x - 4)$ $= (x - 2 - 3i)(x - 2 + 3i)(x + 4)(x - 1)$ <p style="text-align: center;"> <math>\checkmark \quad \quad \checkmark \quad \quad \checkmark \quad \quad \checkmark</math> </p>	(7)

Vraag / Question 4

[11 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
4.1.1	$a=35✓$ & $b=70✓$	(2)
4.1.2	$n = 20✓$ $r + 1 = 12✓$ $\binom{n}{r} = \binom{20}{11}$ $= 167\,960✓$	(3)
4.1.3	$n = 12✓$ $a = 2x ✓$ $b = 3y✓$ $\binom{n}{r} a^{n-r} b^r$ $\binom{12}{r} (2x)^{12-r} (3y)^r ✓$  $r = 7✓$  $\binom{12}{7} (2x)^{12-7} (3y)^7$ $= 55\,427\,328x^5y^7$ $\rightarrow 55\,427\,328y^7$ is the coefficient of / is die koëffisiënt van $x^5✓$	(6)

- EINDE VAN DIE MEMORANDUM / END OF THE MEMORANDUM -