

α -MATHEMATICS

Alpha Wiskunde Graad 11 / *Alpha Mathematics Grade 11*

Termyn 3 Toets 2021 / *Term 3 Test 2021*

MEMORANDUM

Totaal / *Total*: 65 punte / *marks*

Eksaminator / *Examiner*: Lanice Liebenberg

Moderator: Anna Muller

Hierdie memorandum bestaan uit 4 bladsye. /

This memorandum consists of 4 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

Vraag / Question 2

[21 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
2.1	$ P = \sqrt{2^2 + 2^2 + 4^2} \checkmark$ $= 2\sqrt{6} \checkmark$	(2)
2.2	$2P + Q$ $= 2(2; -2; 4) + (-1; 5; -3)$ $= (4; -4; 8) \checkmark + (-1; 5; -3)$ $= (3; 1; 5) \checkmark \checkmark$	(3)
2.3	$P \times Q$ $= \begin{vmatrix} i & j & k \\ 2 & -2 & 4 \\ -1 & 5 & -3 \end{vmatrix} \checkmark$ $= (6 - 20)i - (-6 + 4)j + (10 - 2)k$ $= -14i \checkmark + 2j \checkmark + 8k \checkmark$	(4)
2.4	$P \cdot Q = 2(-1) - 2(5) + 4(-3)$ $= -24 \checkmark$ $P \cdot Q = P \times Q \times \cos\theta$ $-24 = 2\sqrt{6} \checkmark \times \sqrt{1^2 + 5^2 + 3^2} \checkmark \times \cos\theta \checkmark$ (sub into formula) $-24 = 2\sqrt{6} \times \sqrt{35} \times \cos\theta$ $\theta = \arccos\left(\frac{-24}{2\sqrt{6} \times \sqrt{35}}\right)$ $\approx 2,55 \text{ rad} \checkmark \checkmark$	(6)

2.5	$P \cdot R = 0 \checkmark$ $2x - 2(8) + 4(3) = 0 \checkmark$ $2x = 4$ $x = 2 \checkmark$	(3)
2.6	$P \times Q$ $= -14i + 2j + 8k$ (from question 2.3) Area of parallelogram = $ P \times Q $ $= \sqrt{14^2 + 2^2 + 8^2} \checkmark$ $\approx 16,25 \text{ units}^2 \checkmark \checkmark$	(3)

Vraag / Question 3

[11 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
3.1	$x = C \checkmark ; G \checkmark$	(2)
3.2	$x = H \checkmark$	(2)
3.3	$x = H \checkmark ; L \checkmark$	(2)
3.4	$x = C \checkmark ; G \checkmark$	(2)
3.5	$x = C ; D \checkmark ; G ; H \checkmark ; J ; L \checkmark$	(3) One mark for every two correct answers.

Vraag / Question 4

[14 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
4.1	$f(x) = (x^4 - 1)(x^3 - 1)$ $f'(x) = 4x^3(x^3 - 1) \checkmark + \checkmark (x^4 - 1) \cdot 3x^2 \checkmark$ OR $f(x) = x^7 - x^4 - x^3 + 1$ $f'(x) = 7x^6 \checkmark - 4x^3 \checkmark - 3x^2 \checkmark$	(3)
4.2	$D_x \left[\left(\sqrt[4]{x} + \frac{1}{\sqrt{x}} \right)^3 \right]$ $= D_x \left[\left(x^{\frac{1}{4}} + x^{-\frac{1}{2}} \right)^3 \right] \checkmark$ $= 3 \left(x^{\frac{1}{4}} + x^{-\frac{1}{2}} \right)^2 \checkmark \left(\frac{1}{4} x^{-\frac{3}{4}} \checkmark - \frac{1}{2} x^{-\frac{3}{2}} \checkmark \right)$	(4)

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
4.3	$\frac{d}{dx}(x^4 \cos x)$ $= 4x^3 \cos x \checkmark + \checkmark x^4(-\sin x) \checkmark$	(3)
4.4	$\frac{d}{da} \left(\frac{\tan a}{2a + 1} \right)$ $= \frac{\sec^2 a(2a + 1) \checkmark - \checkmark \tan a(2) \checkmark}{(2a + 1)^2 \checkmark}$	(4)

Vraag / Question 5

[9 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
5.1	$\int \frac{1}{1 + (3 - x)^2}$ $= \frac{\arctan(3 - x) \checkmark}{-1 \checkmark \checkmark} + c \checkmark$	(4)
5.2	$\int \frac{5}{x^3} - 4x^6 + 5 dx$ $= \int 5x^{-3} - 4x^6 + 5 dx \checkmark$ $= \frac{5x^{-2}}{-2} \checkmark - \frac{4x^7}{7} \checkmark + 5x \checkmark + c \checkmark$	(5)

- EINDE VAN DIE MEMORANDUM / END OF THE MEMORANDUM -