α-MATHEMATICS

Alpha Wiskunde Graad 11 / *Alpha Mathematics Grade 11*

Kwartaal 3 Toets 2023 / *Term 3 Test 2023*

MEMORANDUM

Totaal / *Total*: 80 punte / *marks*

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Moderator: Rika Grobler

Hierdie memorandum bestaan uit 4 bladsye. /
This memorandum consists of 4 pages.

Vraag / *Question* 1 **[20 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
1.6	A	B	C	D
1.7	A	B	C	D
1.8	A	B	C	D
1.9	A	B	C	D
1.10	A	B	C	D

Vraag / *Question* 2 **[24 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
2.1.1	$x = 0\,; x = 2$✓✓	**(2)**
2.1.2	$x = -2$✓✓	**(2)**
2.1.3	$x = 0$✓✓	**(2)**
2.1.4	$x = 2$✓✓	**(2)**
2.1.5	$x = 0\,; x = 2$✓✓	**(2)**
2.2.	Domain: $x \in \mathbb{R}$✓✓ Range: $y \in \mathbb{R}\,; y \leq 9$ ✓✓	**(4)**
2.3	$\lim\limits_{x\to 2^-} ax^2 + 10$✓ $= \lim\limits_{x\to 2^+} x^2 - 6x + b$ ✓ $4a + 10 = -8 + b$✓ $b = 4a + 18$✓ $\lim\limits_{x\to 2^-} 2ax$✓ $= \lim\limits_{x\to 2^+} 2x - 6$✓ $4a = -2$✓ $a = -\frac{1}{2}$✓ $b = 4\left(-\frac{1}{2}\right) + 18$✓ $b = 16$✓	**(10)**

Vraag / *Question* 3 **[15 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
3.1	$\sqrt{6^2 + 2^2 + 3^2} = 7$ $\left(\frac{6}{7}; \frac{2}{7}; \frac{3}{7}\right)$ ✓✓✓	**(3)**
3.2	$\boldsymbol{u}.\boldsymbol{w} = 1(5) + 7(-2) - 1(1) = -10$✓ $-10 = \sqrt{1^2 + 7^2 + 1^2}$✓$.\sqrt{5^2 + 2^2 + 1^2}$✓$.\cos\theta$ $\theta = 1{,}83\ rad$✓✓	**(5)**
3.3	$\boldsymbol{v} \times \boldsymbol{w} = \begin{vmatrix} i & j & k \\ 6 & 2 & 3 \\ 5 & -2 & 1 \end{vmatrix}$ ✓ $\boldsymbol{v} \times \boldsymbol{w} = i(2 + 6) - j(6 - 15) + k(-12 - 10)$ $\boldsymbol{v} \times \boldsymbol{w} = 8i + 9j - 22k$	**(7)**

Vraag / *Question* 4 **[12 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
4.1	$f'(x) = \frac{1}{2}\cot\left(\frac{2}{x}\right)\checkmark + \frac{x}{2}\checkmark\left(\text{cosec}^2\left(\frac{2}{x}\right)\right)\checkmark . -2x^{-2}\checkmark$	**(4)**
4.2	$y' = \frac{1}{1+\left(\sqrt{x}\right)^2}\checkmark \times \frac{1}{2}\checkmark x^{-\frac{1}{2}}\checkmark$	**(3)**
4.3	$g'(x) = 4\checkmark\left(\frac{x^3}{x^2-1}\right)^3\checkmark\left(\frac{3x^2(x^2-1)\checkmark - x^3(2x)\checkmark}{(x^2-1)^2\checkmark}\right)$	**(5)**

Vraag / *Question* 5 **[9 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
5.1.1	$\int \frac{1}{\sqrt{144-x^2}}dx$ $= \int \frac{1}{\sqrt{144\left(1-\frac{1}{144}x^2\right)}\checkmark}dx$ $= \frac{1}{12}\int \frac{1}{\sqrt{1-\left(\frac{x}{12}\right)^2}\checkmark}dx$ $= \arcsin\left(\frac{x}{12}\right) + c\checkmark\checkmark$	**(4)**
5.1.2	$\int_1^4 \sqrt{x}(1-2x)\,dx$ $= \frac{2x^{\frac{3}{2}}}{3} - \frac{4x^{\frac{5}{2}}}{5}\Big|_1^4\checkmark\checkmark$ $= \left(\frac{2(4)^{\frac{3}{2}}}{3} - \frac{4(4)^{\frac{5}{2}}}{5}\right)\checkmark - \left(\frac{2(1)^{\frac{3}{2}}}{3} - \frac{4(1)^{\frac{5}{2}}}{5}\right)\checkmark$ $= -\frac{302}{15}\checkmark$	**(5)**

- EINDE VAN DIE MEMORANDUM / *END OF THE MEMORANDUM* -