

# **$\alpha$ -MATHEMATICS**

**Alpha Wiskunde Graad 10 / *Alpha Mathematics Grade 10***

**Termyn 3 Toets 2021 / *Term 3 Test 2021***

## **MEMORANDUM**

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

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

**Moderator: Anna Muller**

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

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

**Vraag / Question 1****[4 punte / marks]**

1.1	A	B	<b>C</b>	D
1.2	<b>A</b>	B	C	D

**Vraag / Question 2****[20 punte / marks]**

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
2.1	$f(x) = 5x^6 - \frac{1}{2}x^2 + 7x - 1$ $f'(x) = 30x^5 \checkmark - x \checkmark + 7 \checkmark$	(3)
2.2	$f(a) = 2p^3 - \frac{3}{a} + 5$ $f(a) = 2p^3 - 3a^{-1} \checkmark + 5$ $f'(a) = 3a^{-2} \checkmark$	(2)
2.3	$f(x) = 3ax^2 + \frac{1}{2}a^3x^4$ $f'(x) = 6ax \checkmark + 2a^3x^3 \checkmark \checkmark$	(3)
2.4	$f(x) = (3 - x)(2 + 5x + x^2)$ $f(x) = -x^3 - 2x^2 \checkmark + 13x + 6 \checkmark$ $f'(x) = -3x^2 \checkmark - 4x \checkmark + 13 \checkmark$	(5)
2.5	$f(x) = \sqrt[4]{16x^3} + \frac{2}{\sqrt{x^4-1}}$ $f(x) = 2x^{\frac{3}{4}} \checkmark + 2(x^4 - 1)^{-\frac{1}{2}} \checkmark$ $f'(x) = \frac{3}{2}x^{-\frac{1}{4}} \checkmark - \checkmark(x^4 - 1)^{-\frac{3}{2}} \checkmark \cdot 4x^3 \checkmark$	(7)

**Vraag / Question 3****[16 punte / marks]**

ANTWOORD / ANSWER		PUNTE / MARKS
3.1	$\int 5x^2 dx$ $= \frac{5}{3}x^3 \checkmark + c \checkmark$	(2)
3.2	$\int (6x^3 + 2x - 3) dx$ $= \frac{6x^4}{4} + \frac{2x^2}{2} - 3x + c$ $= \frac{3x^4}{2} \checkmark + x^2 \checkmark - 3x \checkmark + c \checkmark \quad (\text{full marks if not simplified})$	(4)
3.3	$\int \left( \sqrt[4]{x} + \frac{2}{x^2} \right) dx$ $= \int x^{\frac{1}{4}} dx \checkmark + 2 \int x^{-2} dx \checkmark$ $= \frac{4x^{\frac{5}{4}}}{5} \checkmark - 2x^{-1} \checkmark + c \checkmark$	(5)
3.4	$\int \frac{1}{\sqrt[5]{(1-2x)^4}} dx$ $= \int (1-2x)^{-\frac{4}{5}} dx \checkmark$ $= \frac{5 \checkmark (1-2x)^{\frac{1}{5}} \checkmark}{-2 \checkmark} + c \checkmark$	(5)

## Vraag / Question 4

[12 punte / marks]

NR. NO	ANTWOORD / ANSWER	PUNTE / MARKS
4.1	$f(x) = g(x)$ $x^2 - 9 = -x^2 + 4x + 7 \checkmark$ $x^2 - 2x - 8 = 0 \checkmark$ $(x - 4)(x + 2) = 0$ $x = 4; -2 \checkmark$ $\int_{-2}^4 [(-x^2 + 4x + 7) - (x^2 - 9)] dx \checkmark$ $= \int_{-2}^4 (-2x^2 + 4x + 16) dx$ $= -\frac{2x^3}{3} \checkmark + \frac{4x^2}{2} \checkmark + 16x \checkmark \Big _{-2}^4$ $= \left[ -\frac{2(4)^3}{3} + \frac{4(4)^2}{2} + 16(4) \right] \checkmark - \left[ -\frac{2(-2)^3}{3} + \frac{4(-2)^2}{2} + 16(-2) \right] \checkmark$ $= 72 \checkmark$	<b>(10)</b>
4.2	$V = \pi \int_1^2 (x^2 - 9)^2 dx \checkmark$ $= \pi \int_1^2 (x^4 - 18x^2 + 81) dx \checkmark$ $= \pi \left[ \frac{x^5}{5} \checkmark - \frac{18x^3}{3} \checkmark + 81x \checkmark \right]_1^2$ $= \left[ \frac{(2)^5}{5} - \frac{18(2)^3}{3} + 81(2) \right] \checkmark - \left[ \frac{(1)^5}{5} - \frac{18(1)^3}{3} + 81(1) \right] \checkmark$ $= \frac{226}{5} \pi \checkmark$ $\approx 142,00 \text{ units}^3 \checkmark \checkmark$	<b>(10)</b>

- EINDE VAN DIE MEMORANDUM / END OF THE MEMORANDUM -