α-MATHEMATICS

Alpha Wiskunde Graad 10 / *Alpha Mathematics Grade 10*

Junie Eksamen 2021 / *June examination 2021*

MEMORANDUM

Totaal / *Total*: 110 punte / *marks*

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Moderator: Anna Muller

Hierdie memorandum bestaan uit 8 bladsye. /
This memorandum consists of 8 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

NR. NO	ANTWOORD *ANSWER*	BEREKENINGE (nie vir nasien doeleindes nie) *CALCULATIONS (not for marking purpose)*	PUNTE *MARKS*
1.1	C	$x^* = 6 - 7i$	**(2)**
1.2	A	2 rows and 3 columns	**(2)**
1.3	D	$60° \times \frac{\pi}{180°} = \frac{\pi}{3}$	**(2)**
1.4	C	$(1 \times 2) \times (2 \times 3)$	**(2)**
1.5	A	$tan\theta = \frac{6}{8}$ $\theta = 0{,}6435$	**(2)**
1.6	C	$(4\,;1) - (3\,;-1) = (1\,;2)$	**(2)**
1.7	C	$\begin{bmatrix} 1 & -2 & 3 \\ -4 & 5 & -6 \end{bmatrix}$	**(2)**
1.8	D	$\sqrt{-16(-1)}$ $= \sqrt{16}$ $= 4$	**(2)**
1.9	B	$s = r\theta$ $s = 2.\frac{\pi}{2}$ $s = \pi$	**(2)**
1.10	A	$(f \circ g)(-2) = \sqrt{(-2)^2} = 2$	**(2)**

Vraag / *Question* 2 **[26 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
2.1.1	$Re(i^2 - 2i)$ $= Re(-1 - 2i)$✓ $= -1$✓	**(2)**
2.1.2	i^{110} $= i^{108}.i^2$ $= 1.-1$✓ $= -1$✓	**(2)**
2.1.3	$3i - 5 + 2i - 3i^2 + 7 - i$ $= 2 + 4i - 3(-1)$✓ $= 5 + 4i$✓✓	**(3)**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
2.1.4	$(2+5i)(3-i)$ $=6-2i+15i-5i^2$✓ $=6+13i-5(-1)$✓ $=11+13i$✓✓	**(4)**
2.1.5	$\frac{2-i}{3+i}\times\frac{3-i}{3-i}$✓ $=\frac{6-5i+i^2}{9-i^2}$✓ $=\frac{6-5i-1}{9-(-1)}$✓ $=\frac{5-5i}{10}$ $=\frac{1}{2}-\frac{i}{2}$✓✓	**(5)**
2.2	$(1+2i)^2=(a+bi)(2-i)$ $1+4i+4i^2$✓ $=2a+2bi-ai-bi^2$✓✓ $1+4i-4$✓ $=2a+b+2bi-ai$ $4i-3=(2a+b)$✓ $+i(2b-a)$ ✓ $2a+b=-3$✓ … ① $\quad 2b-a=4$✓ … ② $\underline{② \times 2: -2a+4b=8 \ldots ③}$ $5b=5$ $b=1$✓ $2a+1=-3$ $2a=-4$ $a=-2$✓	**(10)**

Vraag / *Question* 3 **[10 punte / *marks*]**

ANTWOORD / *ANSWER*	PUNTE / *MARKS*
$\frac{2x^2+5x-1}{x^3-x} = \frac{2x^2+5x-1}{x(x^2-1)} = \frac{2x^2+5x-1}{x(x+1)(x-1)}$✓ $\equiv \frac{A}{x} + \frac{B}{x+1} + \frac{C}{x-1}$✓ $2x^2 + 5x - 1 \equiv A(x+1)(x-1) + Bx(x-1) + Cx(x+1)$✓ Let $x = 1$ $2 + 5 - 1 = 2C$✓ $C = 3$✓ Let $x = -1$✓ $2 - 5 - 1 = 2B$ $B = -2$✓ Let $x = 0$✓ $-1 = -A$ $A = 1$✓ $\frac{2x^2+5x-1}{x^3-x} = \frac{1}{x} - \frac{2}{x+1} + \frac{3}{x-1}$✓	**(10)**

Vraag / *Question* 4 **[10 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
4.1	$u.v = (3 \times 12) + (12 \times -4) = 0$✓ $\|u\| = \sqrt{3^2 + 9^2} = 3\sqrt{10}$✓ $\|v\| = \sqrt{12^2 + (-4)^2} = 4\sqrt{10}$✓ $\|u\|.\|v\|.cos\theta = 0$ $3\sqrt{10}.4\sqrt{10}.cos\theta$✓ $= 0$✓ $\theta = \frac{\pi}{2}$✓	**(6)**
4.2	Right angle✓✓	**(2)**
4.4	Same direction✓ Equal magnitude✓	**(2)**

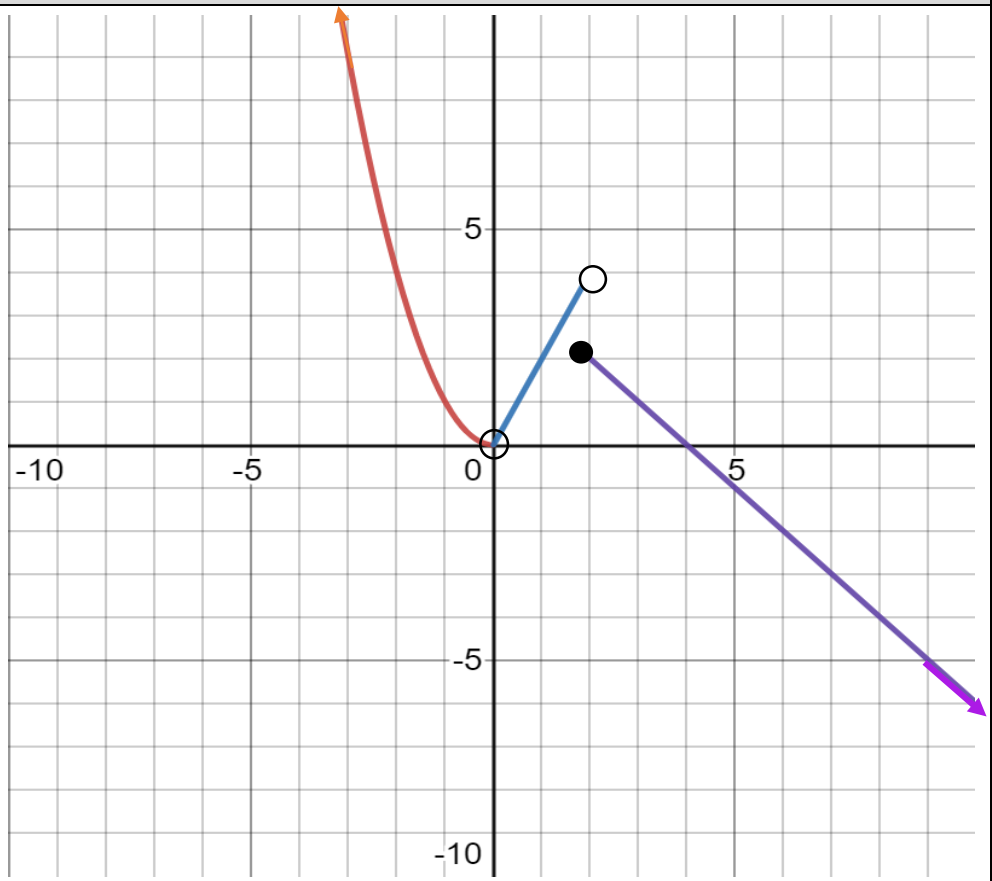
Vraag / *Question* 5 **[32 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
5.1.1	$(5 \quad -2 \quad 3 \quad 0) - (1 \quad 3 \quad -4 \quad 6)$ $= (4 \quad -5 \quad 7 \quad -6)$✓✓	**(2)**
5.1.2	$-2\begin{bmatrix} 0 & 4 \\ 3 & -6 \end{bmatrix} + 3\begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix}$ $= \begin{bmatrix} 0 & -8 \\ -6 & 12 \end{bmatrix} + \begin{bmatrix} 3 & -6 \\ 12 & 9 \end{bmatrix}$✓✓ $= \begin{bmatrix} 3 & -14 \\ 6 & 21 \end{bmatrix}$ ✓✓	**(4)**
5.1.3	$\begin{pmatrix} -2 & 3 \\ 4 & -1 \\ 6 & 2 \end{pmatrix}\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ $= \begin{pmatrix} -2(-5) + 3(3) \\ 4(-5) - 1(3) \\ 6(-5) + 2(3) \end{pmatrix}$✓✓✓ $= \begin{pmatrix} 19 \\ -23 \\ -24 \end{pmatrix}$✓✓✓	**(6)**

5.1.4	$\begin{vmatrix} 2 & -2 & 2 \\ -3 & 3 & 3 \\ 4 & 0 & 4 \end{vmatrix}$ $= 2\begin{vmatrix} 3 & 3 \\ 0 & 4 \end{vmatrix}$✓ $+ 2\begin{vmatrix} -3 & 3 \\ 4 & 4 \end{vmatrix}$✓ $+ 2\begin{vmatrix} -3 & 3 \\ 4 & 0 \end{vmatrix}$✓ $= 2\big(3(4) - 3(0)\big)$✓ $+ 2\big(-3(4) - 3(4)\big)$✓ $+ 2(-3(0) - 3(4))$✓ $= 24 - 48 - 24$ $= -48$✓	**(7)**
5.2.1	$\begin{pmatrix} 2 & 1 \\ -3 & -1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix}$✓ $= \begin{pmatrix} 11 \\ -15 \end{pmatrix}$✓	**(2)**
5.2.2	$\begin{vmatrix} 2 & 1 \\ -3 & -1 \end{vmatrix} = 2(-1) - 1(-3) = 1$✓ $\begin{vmatrix} 11 & 1 \\ -15 & -1 \end{vmatrix} = 11(-1) - 1(-15) = 4$✓ $x = \frac{4}{1} = 4$✓✓	**(4)**

Vraag / *Question* 6 **[12 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
6.1	$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}}$✓✓ $g(x) = x - 2$✓✓	**(4)**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
6.2		**(8)** **✓✓Begin and end points of x^2** **✓✓Begin and end points of $2x$** **✓✓Begin and end points of $4-x$** **✓✓Overall shape**

Vraag / *Question* 7 **[7 punte / *marks*]**

NR. NO	ANTWOORD / *ANSWER*	PUNTE / *MARKS*
7.1	$AC = 5\left(\frac{\pi}{3}\right) = 5{,}24$✓ $BD = 14\left(\frac{\pi}{3}\right) = 14{,}66$✓ $Perimeter = 5{,}24 + 14{,}66 + 18 = 37{,}90\ m$✓✓	**(4)**
7.2	Area$= \frac{1}{2}(14)^2.\frac{\pi}{3}$✓ $-\frac{1}{2}(5)^2.\frac{\pi}{3}$✓ $= 89{,}54\ m^2$✓	**(3)**

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