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**NASIONALE
STRATEGIE VIR LEERDER PRESTASIE**

GRAAD 12

WISKUNDE VRAESTEL 2

MEMORANDUM/NASIEN RIGLYNE SEPTEMBER 2009

PUNTE: 150

Hierdie memorandum bestaan uit 8 bladsye

<u>VRAAG 1</u>			
1.1	$M\left(\frac{-2+1}{2}, \frac{-2+4}{2}\right)$ $M\left(-\frac{1}{2}; 1\right)$	(3)	✓ instel ✓ x-waarde ✓ y-waarde
1.2	$AB^2 = (-2 - 1)^2 + (-2 - 4)^2$ $= 9 + 36$ $= 45$ $AB = \sqrt{45} = 3\sqrt{5}$ eenhede	(4)	✓ instel ✓ vereenv ✓ AB ✓ vereenv vorm
1.3	$m_{BC} = \frac{1-(-2)}{4-(-2)} = \frac{3}{6} = \frac{1}{2}$ BC: $y - 1 = \frac{1}{2}(x - 4)$ of $y - (-2) = \frac{1}{2}(x - (-2))$ $y = \frac{1}{2}x - 1$ $y = \frac{1}{2}x - 1$	(4)	✓ instel ✓ waarde v. m ✓ instel ✓ vgl
1.4	$\tan \alpha = \frac{1}{2} \quad \therefore \alpha = 26,56^\circ$ $\tan \beta = m_{AB} = \frac{4-(-2)}{1-(-2)} = \frac{6}{3} = 2 \quad \therefore \beta = 63,43^\circ$ $\therefore \theta = 63,43^\circ - 26,56^\circ$ $= 36,9^\circ$	(6)	✓ $\tan \alpha = m_{BC}$ ✓ α ✓ $m_{AB} = 2$ ✓ β ✓ $\beta - \alpha$ ✓ θ
1.5	$m_{AE} = \frac{-4-4}{k-1} = -2$ $\therefore k - 1 = 4$ $\therefore k = 5$	(3)	✓ instel m_{AE} ✓ = -2 ✓ waarde v k
1.6	$C''(1; -4)$	(2)	✓ x-waarde ✓ y-waarde
[22]			

VRAAG 2

2.1.1	P(0; 4)	(1)	✓ antw
2.1.2	$x^2 + (-2x + 4)^2 = 16$ $x^2 + 4x^2 - 16x + 16 = 16$ $5x^2 - 16x = 0$ $x(5x - 16) = 0$ $x_Q = 3\frac{1}{5}$ $y_Q = -2(3\frac{1}{5}) + 4 = -2\frac{2}{5}$	(5)	✓ vervang ✓ uitbreiding ✓ standaardvorm ✓ fakt ✓ instel + y-waarde
2.1.3	$m_{OQ} = \frac{-2\frac{2}{5}}{3\frac{1}{5}} = -\frac{3}{4}$ $m_{rkl} = \frac{4}{3}$	(3)	✓ instel ✓ m_{OQ} ✓ m_{rkl}
2.1.4	$(x + 3)^2 + (y - 2)^2 = 16$	(3)	✓ $(x + 3)$ ✓ $(y - 2)$ ✓ vgl
2.2.1	$(x + 4)^2 + y^2 = 25$ $\therefore M(-4; 0)$	(5)	✓✓ vgl ✓✓ x-waarde ✓ y-waarde
2.2.2	$x = -9$ en $x = 1$	(2)	✓ $x = -9$ ✓ $x = 1$
		[19]	

VRAAG 3

3.1.1	refleksie om die lyn $y = -x$	(2)	✓✓ antw
3.1.2	$(x; y) \rightarrow (-y; -x)$	(2)	✓✓ antw
3.1.3	rotasie van 180° om die oorsprong	(2)	✓ 180° ✓ oorsprong
3.1.4	$(x; y) \rightarrow (-x; -y)$	(2)	✓✓ antw
3.1.5	$k = \frac{-7.5}{-5} = \frac{3}{2}$	(2)	✓✓ antw
(a)			
(b)	$F(-4\frac{1}{2}; -1\frac{1}{2})$	(2)	✓✓ antw
3.1.6	opp v. ABC = $\frac{4}{9} \times 18p = 6p$ vk eenh	(2)	✓✓ $\frac{4}{9}$ ✓ antw

3.2	$x_B = x \cos \theta - y \sin \theta$ $= -1 \cos 120^\circ - 5 \sin 120^\circ$ $= -3,83$ $y_B = y \cos \theta + x \sin \theta$ $= 5 \cos 120^\circ - 1 \sin 120^\circ$ $= -3,37$ $B(-3,83; -3,37)$	(5)	✓ formule ✓ 120° ✓ x-waarde ✓ formule ✓ y-waarde
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VRAAG 4

4.1.1	$\tan \alpha = \frac{6}{8} = \frac{3}{4}$	(1)	✓ antw
4.1.2	$a = -5$	(1)	✓ antw
4.1.3	$-\cos \beta$ $= -(\frac{-5}{13}) = \frac{5}{13}$	(2)	✓ omskakeling ✓ antw
4.1.4	$-\sin \alpha$ $= -(\frac{6}{10}) = \frac{3}{5}$	(3)	✓ omskakeling ✓ 10 ✓ antw
4.1.5	$\cos \beta \cdot \cos \alpha + \sin \beta \cdot \sin \alpha$ $= (-\frac{5}{13})(\frac{8}{10}) + (\frac{12}{13})(\frac{6}{10})$ $= \frac{32}{130} = \frac{16}{65}$		✓ formule ✓✓ instel

		(4)	✓ antw
4.2.1	$\text{LK} = \frac{2\sin^3 x + 2\sin x \cdot \cos x \cdot \cos x}{\cos x}$ $= \frac{2\sin x(\sin^2 x + \cos^2 x)}{\cos x}$ $= \frac{2\sin x(1)}{\cos x}$ $= 2 \tan x = \text{RK}$	(4)	✓ $2\sin x \cdot \cos x$ ✓ fakt ✓ 1 ✓ $\tan x$
4.2.2	$\cos x = 0$ $\therefore x = -90^\circ; 90^\circ$	(2)	✓ -90° ✓ 90°
4.3	$\frac{(-\sin 80^\circ)^2}{(-\cos 10^\circ) \cdot \sin 40^\circ \cdot \cos 40^\circ}$ $= \frac{\sin^2 80^\circ}{(-\sin 80^\circ) \cdot \frac{1}{2} \sin 80^\circ}$ $= -2$	(6)	✓ $-\sin 80^\circ$ ✓ $-\cos 10^\circ$ ✓ $\sin^2 80^\circ$ ✓ $-\sin 80^\circ$ ✓ $\frac{1}{2} \sin 80^\circ$ ✓ -2
4.4	$2\cos^2 x - 1 - \cos x - 2 = 0$ $2\cos^2 x - \cos x - 3 = 0$ $(2\cos x - 3)(\cos x + 1) = 0$ $\therefore \cos x = \frac{3}{2}$ geen opl of $\cos x = -1$ $\therefore x = 180^\circ + 360^\circ k; k \in \mathbb{Z}$	(8)	✓ $2\cos^2 x - 1$ ✓ standaardvorm ✓ faktore ✓ ops vir $\cos x$ ✓ geen opl ✓ 180° ✓ $+360^\circ k$ of $\pm 360^\circ k$ ✓ $k \in \mathbb{Z}$ of $k \in \mathbb{N}_0$
		[31]	

VRAAG 5

5.1	$\cos(x + 60^\circ) = \sin 2x = \cos(90^\circ - 2x)$ $\therefore x + 60^\circ = 90^\circ - 2x + 360^\circ k$ $3x = 30^\circ + 360^\circ k$ $x = 10^\circ + 120^\circ k$ <p style="text-align: center;">or</p> $x + 60^\circ = 360^\circ - (90^\circ - 2x) + 360^\circ k$ $-x = 210^\circ + 360^\circ k$ $x = -210^\circ + 360^\circ k$ $\therefore x = 10^\circ; -110^\circ$	(7)	$\checkmark \cos(90^\circ - 2x)$ \checkmark vgl \checkmark alg opl vir x \checkmark vgl \checkmark alg opl vir x $\checkmark \checkmark$ oplossings
5.2		(7)	f : \checkmark eindpte \checkmark draaipte \checkmark x -afsnitte \checkmark y -afsnit g : $\checkmark \checkmark$ draaipte \checkmark x -afsnitte
5.3	$x \in (-110^\circ; 10^\circ)$ or $-110^\circ < x < 10^\circ$	(2)	\checkmark eindwaardes \checkmark tussen

[16]

VRAAG 6

6.1	$\tan 65^\circ = \frac{PQ}{5,9} \quad \therefore PQ = 5,9 \tan 65^\circ$ $= 12,652\dots = 13 \text{ m}$	(2)	✓ gebruik cos ✓ naaste meter
6.2	$\frac{\sin \angle QPR}{QR} = \frac{\sin \angle PRQ}{PQ}$ $\frac{\sin(180-2x)}{RQ} = \frac{\sin x}{PQ}$ $RQ = \frac{PQ \cdot \sin 2x}{\sin x}$ $= \frac{13 \times 2 \sin x \cdot \cos x}{\sin x}$ $= 26 \cos x$ <p>of</p> $QR^2 = PQ^2 + PR^2 - 2PQ \cdot PR \cdot \cos \angle QPR$ $= 13^2 + 13^2 - 2(13)(13) \cdot \cos(180^\circ - 2x)$ $= 338 - 338(-\cos 2x)$ $= 338 + 338(2\cos^2 x - 1)$ $= 676 \cos^2 x$ $QR = 26 \cos x$	(5)	✓ sin-reël ✓ instel ✓ RQ en sin 2x ✓ 2sinx.cosx ✓ antw ✓ cos-reël ✓ instel ✓ -cos 2x ✓ 2cos ² x - 1 ✓ antw
6.3	$\text{Opp} = \frac{1}{2} QP \cdot PR \cdot \sin \angle QPR$ $= \frac{1}{2} (13)(13) \cdot \sin 96^\circ$ $= 84,04 \text{ m}^2$	(4)	✓ opp-reël ✓ instel ✓ 96° ✓ antw
		[11]	

VRAAG 7

7.1	vraestel 2 6 vd leerders se V2 punte is swakker en 1 leerder s'n is dieselfde vir beide vraestelle	(2)	✓ antw ✓ rede
7.2	reguitlyn	(1)	✓ antw
7.3	±68	(1)	✓ antw (±2)
		[4]	

VRAAG 8

8.1	Klas B 2	(2)	✓keuse ✓antw
8.2	negatief skeef of skeef na links	(1)	✓negatief of links
8.3	$100 - 12 = 88$	(2)	✓waardes ✓antw
8.4	$94 - 30 = 64$	(2)	✓waardes ✓antw
8.5	[94; 100]	(2)	✓94] ✓100
		[9]	

VRAAG 9

9.1.1	gemidd = $\frac{210}{10}$ = 21 leerders		(2)	✓formule instel ✓antw
9.1.2	var = $\frac{384}{10} = 38,4$ SD = $\sqrt{38,4} = 6,2$		(4)	✓384 ✓var ✓SD formule ✓SD
9.1.3	(14,8; 27,2) ∴ 4 weke		(2)	✓interval ✓antw
9.2.1	Klas	Frekwensie	Kumulatiewe frekwensie	(4) ✓✓f-kolom ✓✓kum f-kolom
	(0; 20]	15	15	
	(20; 40]	40	55	
	(40; 60]	55	110	
	(60; 80]	30	140	
	(80; 100]	10	150	
	(100; 120]	5	155	
9.2.2	benaderde gemidd = $\frac{7650}{155} = R49,35$		(3)	✓7650 ✓instel ✓antw
9.2.3	(40;60]		(1)	✓antw
9.2.4	$M_{\text{pos}} = \frac{156}{2} = T_{78}$ Mediaan = R47,50 (±R2,50)		(3)	✓78ste waarde ✓✓antw (±R2,50)
			[19]	TOTAAL: 150