GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENGSE DEPARTEMENT VAN ONDERWYS

PROVINSIALE EKSAMEN

JUNIE 2017

GRAAD 11

WISKUNDE

VRAESTEL 2

MEMORANDUM

10 bladsye

GAUTENGSE DEPARTEMENT VAN ONDERWYS

PROVINSIALE EKSAMEN

WISKUNDE Vraestel 2

MEMORANDUM

INSTRUKSIES EN INLIGTING

A – Akkuraatheid
CA – Volgehoue Akkuraatheid
S – Stelling
R – Rede
SR- Stelling/Rede

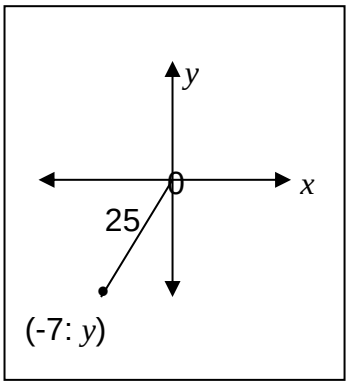
NOTA:

- Indien 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.
- Indien 'n kandidaat 'n antwoord DOODGETREK het, maar dit nie oorgedoen het nie, merk die doodgetrekte antwoord.
- Volgehoue akkuraatheid word in ALLE aspekte van die memorandum toegepas. Hou op nasien by die tweede berekeningsfout.
- Om antwoorde/waardes te veronderstel om 'n probleem op te los, word NIE toegelaat NIE.

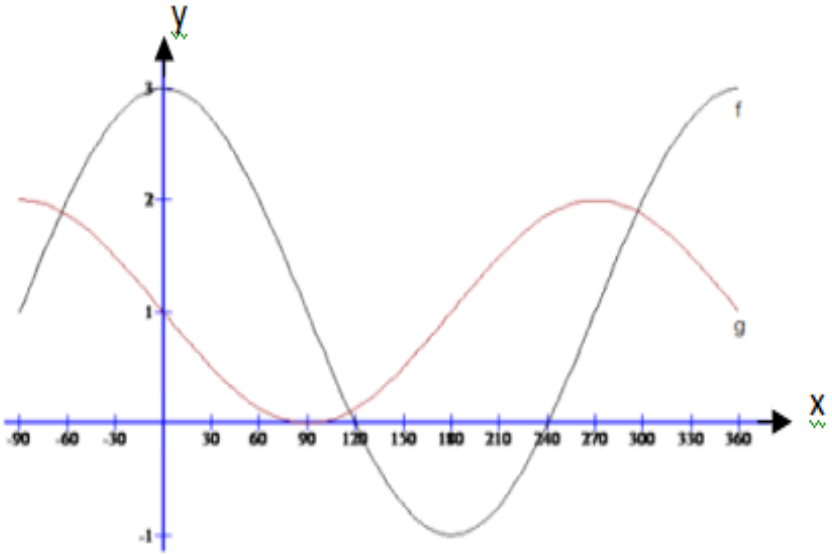
MEMORANDUM	Wiskunde Vraestel 2 GRAAD 11

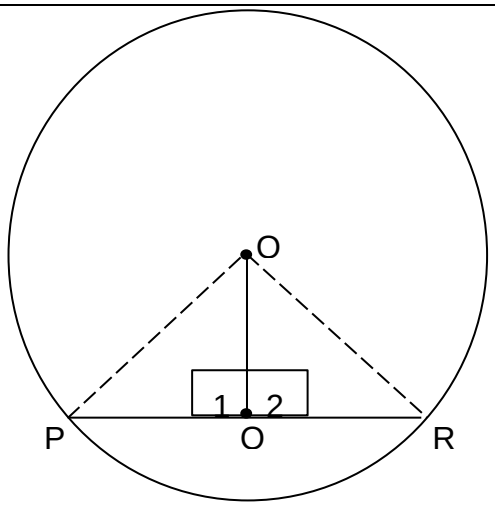
VRAAG 1			**PUNTE: 25**
1.1	$M_{MR}=\frac{6-0}{4-0}$ $=\frac{6}{4}=\frac{3}{2}$ Vergelyking van lyn MR is: $y=\frac{3}{2}x$	✓ vervang in korrekte formule ✓ $m_{MR}=\frac{3}{2}$ ✓ vergelyking van MR	**(3)**
1.2	$y-5x+14=0$ y = 5*x* -14 MS || PR ∴ m_{PR} = 5 Vergelyking van lyn PR: $y-y_1=m(x-x_1)$ $y-4=5(x+2)$ $y=5x+14$	 ✓ m_{MS}= 5 ✓m_{PR} = 5 ✓verv. (–2 ; 4) ✓antwoord	**(4)**
1.3	m_{PR} = 5 ∴ $\tan\alpha=5$ $\alpha=78{,}69°$ $m_{MR}=\frac{3}{2}$ $\tan\beta=\frac{3}{2}$ $\beta=56{,}31°$ ∴ $\theta=\alpha-\beta$ $\theta=22{,}38°$	 ✓$\tan\alpha=5$ ✓$78{,}69°$ ✓$56{,}31°$ ✓∴ $\theta=(\alpha-\beta)$..(som van hoeke v.Δ) ✓$22{,}38°$	**(5)**
1.4	$y=\frac{3}{2}x$ en $y=5x+14$ $5x+14=\frac{3}{2}x$ $10x+28=3x$ $7x=-28$ $x=-4$ $y=-6$ R(–4 ; –6)	 ✓stel $5x+14=\frac{3}{2}x$ ✓$7x=-28$ ✓ $x=-4$ ✓ $y=-6$	**(4)**

1.5	$d_{MR} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(4+4)^2 + (6+6)^2}$ $= \sqrt{64 + 144}$ $= 4\sqrt{13}$	✓verv. in korrekte formule ✓antwoord	**(2)**
1.6	$d_{PR} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(-4+2)^2 + (-6-4)^2}$ $= \sqrt{104}$ or $2\sqrt{26}$ Oppvl van ΔPMR $= \frac{1}{2}PR.MR.\sin\theta$ $= \frac{1}{2}2\sqrt{26}.4\sqrt{13}.\sin 22{,}38°$ **OF** $\frac{1}{2}\sqrt{104}.4\sqrt{13}.\sin 22{,}38°$ $= 28\ eenhede^2$	✓ verv. in korrekte formule ✓$\sqrt{104}$ **OF** $2\sqrt{26}$ ✓$\frac{1}{2}2\sqrt{26}.4\sqrt{13}.\sin 22{,}38°$ **OF** $\frac{1}{2}\sqrt{104}.4\sqrt{13}.\sin 22{,}38°$ (✓ afronding) antwoord ✓	**(5)**
1.7	S(2 ; –4)	✓ $x = 2$ ✓ $y = -4$	**(2)**

VRAAG 2			**PUNTE: 26**
2.1	$y^2 = r^2 - x^2$ $\therefore y^2 = (25)^2 - (-7)^2$ $\therefore y^2 = 576$ $\therefore\ y = -24$ $\therefore 14\tan\theta = 14\left(\frac{-24}{-7}\right)$ $= 48$		✓diagram in korrekte kwadrant ✓ $y = -24$ ✓$\tan\theta = \frac{-24}{-7}$ ✓antwoord	**(4)**
2.2	$\frac{\cos(90°+x).\sin(180°+x)}{\tan 225° - cos^2(-x)}$ $= \frac{(-\sin x)(-\sin x)}{\tan 45° - cos^2 x}$ $= \frac{\sin^2 x}{1 - \cos^2 x}$ $= \frac{\sin^2 x}{\sin^2 x}$ $= 1$		✓ (-sin$x$) (-sin$x$) ✓ $\tan 45°$ ✓ $\cos^2 x$ ✓ $\tan 45° = 1$ ✓ $1 - \cos^2 x = \sin^2 x$ ✓ antwoord	**(6)**

2.3	$2\cos 2\theta = -0{,}44$ $\therefore \quad \cos 2\theta = -0{,}22$ $\therefore$ Verw. hoek $= 77{,}2909\ldots°$ $2\theta = 180° - 77{,}2909\ldots° + k.360°$ $\therefore \quad \theta = 51{,}35° + k.180, k \in Z$ or $2\theta = 180° + 77{,}2909\ldots° + k.360°$ $\therefore \quad \theta = 128{,}65° + k.180°, k \in Z$	✓ $\cos 2\theta = -0{,}22$ ✓ $77{,}2909°$ ✓ $2\theta = 180° - 77{,}2909° + k.360°$ ✓ $\theta = 51{,}35° + k.180, k \in Z$ ✓ $2\theta = 180° + 77{,}2909° + k.360°$ ✓ $\therefore \theta = 128{,}65° + k.180°, k \in Z$	**(6)**
2.4	$\therefore$ LHS $= \dfrac{\tan\theta - \sin\theta}{1-\cos\theta}$ $= \dfrac{\frac{\sin\theta}{\cos\theta} - \frac{\sin\theta}{1}}{1-\cos\theta}$ $= \dfrac{\frac{\sin\theta - \sin\theta.\cos\theta}{\cos\theta}}{1-\cos\theta}$ $= \dfrac{\sin\theta(1-\cos\theta)}{\cos\theta} \times \dfrac{1}{1-\cos\theta}$ $= \dfrac{\sin\theta}{\cos\theta}$ $= \tan\theta$	✓ $\tan\theta = \frac{\sin\theta}{\cos\theta}$ ✓ $\frac{\sin\theta - \sin\theta.\cos\theta}{\cos\theta}$ ✓ $\sin\theta(1-\cos\theta)$ ✓ $\times \frac{1}{1-\cos\theta}$ ✓ $\frac{\sin\theta}{\cos\theta} = \tan\theta$	**(5)**
2.5	$\alpha = 90° - \beta$ $\therefore \dfrac{\cos 20°}{\sin 70°} - \dfrac{\sin(90° - \beta)}{\sin(90° - \beta)}$ $= \dfrac{\sin 70°}{\sin 70°} - 1$ $= 1 - 1$ $= 0$	✓$\cos 20°$ ✓$\sin\alpha = \sin(90° - \beta)$ ✓$\cos 20° = \sin 70°$ ✓$1 - 1$ ✓antwoord	**(5)**

VRAAG 3			PUNTE:14
3.1		✓ y-afsnit van f ✓ y-afsnit van g ✓✓ beide draaipunte van g ✓ beide x-afsnitte van f ✓ beide draaipunte van f	**(6)**
3.2	2	✓✓ antwoord	**(2)**
3.3	$2\cos x + 1 = 1 - \sin x$ $\therefore \quad \sin x = -2\cos x$ $\therefore \quad \tan x = -2$ $\therefore$ Verw. hoek = 63, 4349....° $\therefore \quad x = 180° - 63,4349....° + k.\,180°$ $\therefore \quad x = 116,57° + k.180°$ met $k \in Z$ $\therefore \quad x =$ -63,43° **OF** 116,57° **OF** 296,57°	✓ $\tan x = -2$ ✓ 63, 4349° ✓ $x = 116,57°$ $+k.180°$ met $k \in Z$ ✓ -63,43° ✓ 116, 57° ✓ 296,57°	**(6)**

VRAAG 4		PUNTE: 13
4.1	 Konstruksie: Verbind PO en OR In ΔPOQ and Δ ROQ 1) OQ = OQ..... gemeenskaplik 2) PO = OR .....radii 3) $\widehat{Q}_1 = \widehat{Q}_2 = 90°$... gegee ∴ ΔPOQ ≡ ΔROQ ... 90°HS ∴ PQ = RQ	✓ konstruksie(radii, OP en OR) ✓SR ia (PO = OR ..... radii) ✓S ia ($\widehat{Q}_1 = \widehat{Q}_2 = 90°$) ✓ S R ✓ PQ =RQ **(5)**
4.2.1	$\widehat{A}_1 = 90°$... lyn deur middel punt van ⊙ na middel van koord $\widehat{B} = 180° - (\widehat{O}_1 + \widehat{A}_1)$ .... som van hoeke van Δ $= 50°$	✓ S R ✓ antwoord **(2)**

4.2.2	$\hat{C} = 90°$..... hoek in semi $\odot$ $\hat{D} = 180° - (\hat{C} + \hat{B})$..... som van hoeke van Δ $= 40°$	✓ S R ✓ antwoord **(2)**
4.2.3	$BD = \sqrt{CD^2 + BC^2}$.....Pyth. $= \sqrt{40^2 + 30^2}$ $= 50$ BO = $\frac{1}{2}$BD .....radii $= 25$ OA = $\frac{1}{2}$CD...Midpt. St. $= 20$ AE = OE – OA = 25 – 20 = 5 eenhede	✓ BD = 50 ✓ BO = 25 ✓ SR ie (OA = 20 .. Midpt.St) ✓ AE = 5 **(4)**

VRAAG 5		**PUNTE : 10**
5.1	$\hat{L} = \hat{J}_1 = x$..... hoeke teenoor gelyke sye $\hat{N}_1 = \hat{L} = x$.....= koorde onderspan gelyke hoeke	✓ S R ✓ S ✓ R **(3)**
5.2	$\hat{M} = \hat{J}_3 = y$..... hoeke teenoor = sye $\hat{K}_1 = \hat{M} = y$.....= koorde onderspan gelyke hoeke $\hat{Q}_2 = \hat{K}_1 + \hat{J}_1$... buite hoek van Δ $= x + y$ $\hat{P}_2 = \hat{N}_1 + \hat{J}_3$... buite hoek van Δ $= x + y$ $\therefore \quad \hat{Q}_2 = \hat{P}_2 = x + y$	✓ S R ✓ S R ✓ S R ✓ S R **(4)**
5.3	$\hat{P}_4 = \hat{P}_2$ .... regoorstde. hoeke $\hat{Q}_4 = \hat{Q}_2$ ....regoorstde. hoeke but $\hat{Q}_2 = \hat{P}_2$.....bewys in Vr 5.2 $\therefore \quad \hat{P}_4 = \hat{Q}_4$ $\therefore$ JQ = JP..... sye teenoor = hoeke **OF** gelykb. Δ	✓ S R vir $\hat{P}_4 = \hat{P}_2$ **OF** $\hat{Q}_4 = \hat{Q}_2$ ✓ $\hat{P}_4 = \hat{Q}_4$ ✓ R **(3)**

VRAAG 6		**PUNTE: 12**
6.1	$\hat{K}_2 = \hat{T}_1$..... hoeke teenoor = sye **OF** gelyke radii $\hat{T}_1 = \hat{C}$..... hoeke in selfde segment $\therefore\ \hat{K}_2 = \hat{C}$	✓ S R ✓ $\hat{T} = \hat{C}$ ✓ R **(3)**
6.2	$\hat{T}_2 = \hat{A}$ ..... hoeke teenoor = sye **OF** gelyke radii $\hat{P}_2 = \hat{T}_2 + \hat{A}$... buite hoek van Δ $= 2\hat{T}_2$ $\hat{K}_1 = \hat{P}_2$ ..... hoeke in selfde segment $\hat{K}_1 = 2\hat{T}_2$	✓ S R ✓ S R ✓ $\hat{K}_1 = \hat{P}_2$ ✓ R **(4)**
6.3	$\hat{P}_4 = 2\hat{T}$ ..... midpts. hoek = 2 x omtreks hoek $\hat{T} = \hat{T}_1 + \hat{T}_2$ $\hat{T}_1 = \hat{C}$ ..... hoeke in selfde segment $\hat{T}_2 = \frac{1}{2}\hat{K}_1$ ..... bewys in Vr.6.2 $\hat{P}_4 = 2(\hat{C} + \frac{1}{2}\hat{K}_1)$ $= 2\hat{C} + \hat{K}_1$	✓ $\hat{P}_4 = 2\hat{T}$ ✓ R ✓ S R ✓ $\hat{T}_2 = \frac{1}{2}\hat{K}_1$ ✓ $\hat{P}_4 = 2(\hat{C} + \frac{1}{2}\hat{K}_1)$ **(5)**
		TOTAAL : 100