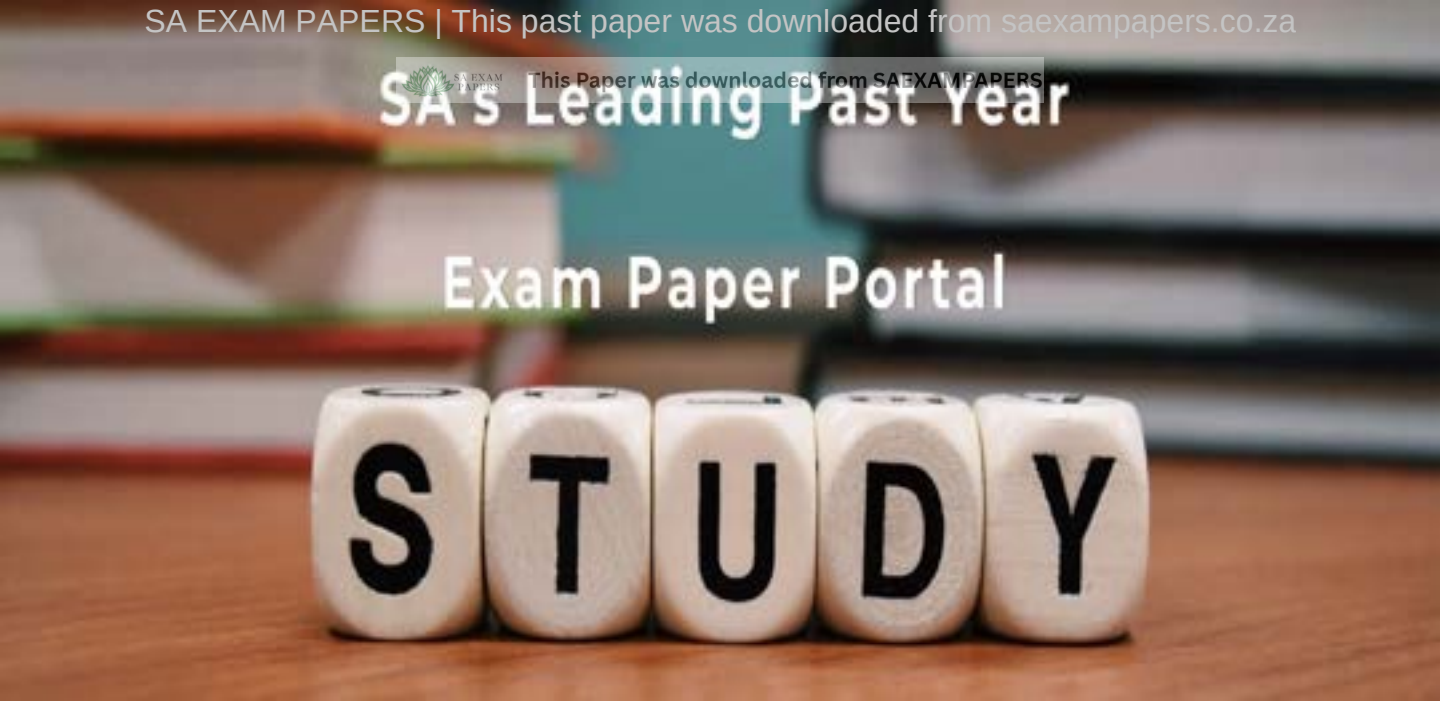


education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT/
PROVINSIALE ASSESSERING

GRADE/GRAAD 12

MATHEMATICS /*WISKUNDE*

MARCH 2026

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

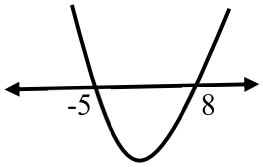
These marking guidelines consist of 8 pages.
Hierdie nasienriglyne bestaan uit 8 bladsye.

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of Marking Guidelines. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

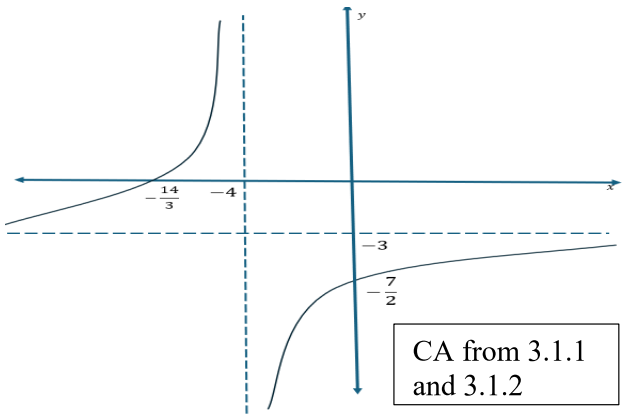
LET WEL:

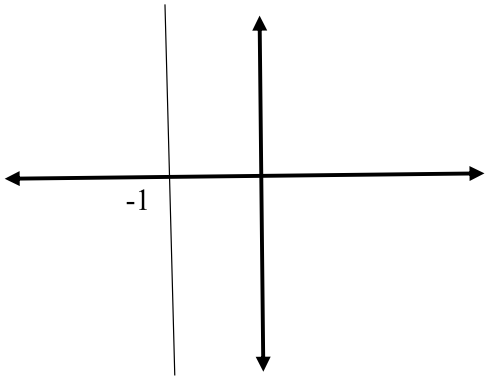
- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.*
- *Volgehoue akkuraatheid word in ALLE aspekte van Nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat NIE.*

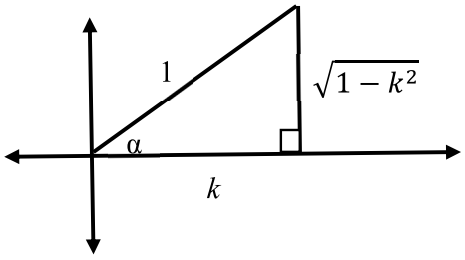
QUESTION 1 [22]		
1.1.1	$x=-3$ or $x=2$	✓ x value ✓ x value (2)
1.1.2	$2x^2+5x-4=0$ $x=\dfrac{-5\pm\sqrt{(5)^2-4(2)(-4)}}{2(2)}$ $x=0.64$ or $x=-3.14$	✓ subst ✓ x value ✓ x value (3)
1.1.3	$x^2-3x-40\le 0$ $(x+5)(x-8)\le 0$ Critical values : -5 ; 8  $-5\le x\le 8$	✓ critical values/factors ✓✓ answer (combo) (3)
1.1.4	$\left(\sqrt{\sqrt{18}+x}\right)\left(\sqrt{\sqrt{18}-x}\right)=x$ $\left(\sqrt{\left(\sqrt{18}+x\right)\left(\sqrt{18}-x\right)}\right)^2=x^2$ $18-x^2=x^2$ $18-2x^2=0$ $9-x^2=0$ $\therefore x=\pm 3$ $x\ne -3$	✓ squaring ✓simplification ✓ std form ✓ x values ✓ rejection (5)
1.2	$(4x-1)^2+\left(y^2-9x\right)^2=0$ $4x-1=0$ $x=\dfrac{1}{4}$ $y^2-9x=0$ $y^2-\dfrac{9}{4}=0$ $\left(y-\dfrac{3}{2}\right)\left(y+\dfrac{3}{2}\right)=0$ $y=\dfrac{3}{2}$ or $y=-\dfrac{3}{2}$	✓ $4x-1=0$ ✓ $x=\dfrac{1}{4}$ ✓ $y^2-9x=0$ ✓substitution ✓factorization ✓both answer (6)

1.3	$\frac{3^{x+1}.27^{x-2}}{9^{2(x-2)}}$ $=\frac{3^{x+1}.3^{3x-6}}{3^{4x-8}}$ $=3^{x+1+3x-6-4x+8}$ $=3^3=27$	✓ powers to base 3 ✓simplification ✓ answer (3)

QUESTION 2[19]		
2.1.1	1; p; 11 4; q $p-1=4$ $11-p=q$ $p=5$ $11-5=q$ $q=6$	✓ $p-1=4$ ✓$11-p=q$ ✓$11-5=q$ (3)
2.1.2	$2a=2$ $3(1)+b=4$ $1+1+c=1$ $a=1$ $b=1$ $c=-1$ $T_n=n^2+n-1$	✓ a ✓ b ✓ c ✓ answer (4)
2.1.3	$T_{100}=100^2+100-1$ $=10099$ CA from 2.1.2	✓ answer (1)
2.2	$S_n=a+ar+ar^2+ar^3+.....+ar^{n-1}-----(1)$ $rS_n=ar+ar^2+ar^3+.....+ar^n-----(2)$ $(1)-(2)$ $S_n-rS_n=a-ar^n$ $(1-r)S_n=a(1-r^n)$ $S_n=\frac{a(1-r^n)}{1-r}$	✓ eqn 1 ✓ eqn 2 ✓ subtraction ✓ factors (4)
2.3	$r=\frac{(x-3)(x+3)}{x+3}=x-3$ $-1<x-3<1$ $2<x<4$ CA r	✓ r ✓ $-1<r<1$ ✓ answer (3)
2.4	$\sum_{k=3}^{20}(5k-4)=11+16+21+....+96$ $n=18$ $S_{18}=\frac{18}{2}(11+96)$ *or* $S_{18}=\frac{18}{2}(2(11)+(18-1)5)$ $=963$ $=963$	✓ expansion ✓ number of terms ✓ subst ✓ answer (4)

QUESTION 3[15]			
3.1.1	$x=-4$ $y=-3$	HA= -3 and VA= - 4 0/2	✓ $x=-4$ ✓ $y=-3$ (2)
3.1.2	$g(x)=\frac{-2}{x+4}-3$ $0=\frac{-2}{x+4}-3$ $0=-2-3(x+4)$ $0=-2-3x-12$ $3x=-14$ $x=-\frac{14}{3}$		✓ y = 0 ✓ answer (2)
3.1.3	 CA from 3.1.1 and 3.1.2		✓ asymptotes ✓ x intercept ✓ y intercept ✓ shape (4)
3.1.4	(−4 ; −3)	CA from 3.1.3 or 3.1.1	✓ *x* coordinate ✓ *y* coordinate (2)
3.2.1	$x=4^y$ $y=\log_4 x$	Accuracy Answer only full	✓ swapping ✓ answer (2)
3.2.2	$x>0$		✓ answer (1)
3.2.3	$y=4^5$ $=1024$	Answer only full	✓ subst ✓ answer (2)

QUESTION 4[12]		
4.1	A(- 4 ; 0) B(2 ; 0)	✓ A ✓ B (2)
4.2	$x = -1$  	✓ x intercept ✓ shape(vertical line) (2)
4.3	f: TP – $y = 18$ new TP – y = -18+1= -17 range: $y \geq -17$ CA y value Answer only full marks	✓ y = 18 ✓ new y = -17 ✓ answer (3)
4.4	$(4-2x)(x+4) = kx+24$ $-2x^2 - 4x + 16 = kx + 24$ $-2x^2 + (-4-k)x - 8 = 0$ $\Delta = (-4-k)^2 - 4(-2)(-8)$ $\Delta = (4+k)^2 - 64$ $(4+k)^2 - 64 < 0$ $(k-4)(k+12) < 0$ $-12 < k < 4$	✓ equating ✓ std form ✓ discriminant ✓ $\Delta < 0$ ✓ answer (5)

QUESTION 5[19]		
5.1.1	 $\sin(\alpha+45°)=\sin\alpha\cos45°+\cos\alpha\sin45°$ $=\sqrt{1-k^2}.\frac{1}{\sqrt{2}}+k.\frac{1}{\sqrt{2}}$ $=\frac{\sqrt{1-k^2}+k}{\sqrt{2}}$	✓ $y=\sqrt{1-k^2}$ ✓ expansion ✓ special angle ✓ subst (4)
5.1.2	$\tan\alpha=\frac{\sqrt{1-k^2}}{k}$	✓ answer (1)
5.2	$\frac{\cos\theta.\frac{\sin\theta}{\cos\theta}}{\cos60°.\sin\theta}$ $=\frac{\sin\theta}{\frac{1}{2}.\sin\theta}$ $=2$	✓ $\cos\theta$ ✓ identity ✓ $\cos60°$ ✓ $\sin\theta$ ✓ answer (5)
5.3	$LHS=2[\cos x\cos30°+\sin x\sin30°-\cos x\cos30°+\sin x\sin30°]$ $=2(2\sin x\sin30°)$ $=2(2.\frac{1}{2}\sin x)$ $=2\sin x$ $RHS=\frac{2\sin x\cos x}{\cos x}$ $=2\sin x$ $\therefore LHS=RHS$	✓ expansion ✓ expansion ✓ special angle ✓ $2\sin x$ ✓ $2\sin x\cos x$ (5)
5.4.1	Amplitude of cos x is 1 **OR** the range is $y\in[-1\,;1]$ **OR** the maximum calue of cos x is 1.	✓ answer (1)
5.4.2	$\cos x=-\frac{1}{2}$ $x=180°\pm60+k.360°\quad k\in z$ $x=120°+k.360°\quad or\quad x=240+k.360°$ **OR**	✓ eqn ✓ general sol, $k\in z$ ✓ general sol (3)

	$\cos x = -\frac{1}{2}$ $x = \pm 120° + k.360° \quad k \in z$	✓ eqn ✓ general sol, $k \in z$ ✓ general sol (3)
QUESTION 6 [13]		
6.1.1	$b = -45°$ $c = -2$	✓ 45 ✓ -2 (2)
6.1.2	$d = -14.64°$ $e = -0.51$	✓ value of d ✓ value of e (2)
6.1.3	$f(new) = \cos(x - 45° + 60°)$ $= \cos(x + 15°)$	✓ +60 ✓ answer (2)
6.1.4	$-180° \le x < -14.64° \quad or \quad 165.36° < x \le 180°$	✓ $-180° \le x < -14.64°$ ✓ $165.36° < x \le 180°$ (2)
6.2	$QU^2 = x^2 + y^2$ $US^2 = x^2 + y^2$ $QS^2 = 2y^2$ $QS^2 = QU^2 + US^2 - 2QU.US\cos Q\hat{U}S$ $2y^2 = x^2 + y^2 + x^2 + y^2 - 2\left(\sqrt{x^2 + y^2}.\sqrt{x^2 + y^2}\right)\cos Q\hat{U}S$ $-2x^2 = -2(x^2 + y^2)\cos Q\hat{U}S$ $\therefore \frac{x^2}{x^2 + y^2} = \cos Q\hat{U}S$	✓ QU^2 ✓ US^2 ✓ QS^2 ✓ subst in cosine rule ✓ simplification (5)
	Total	**[100]**