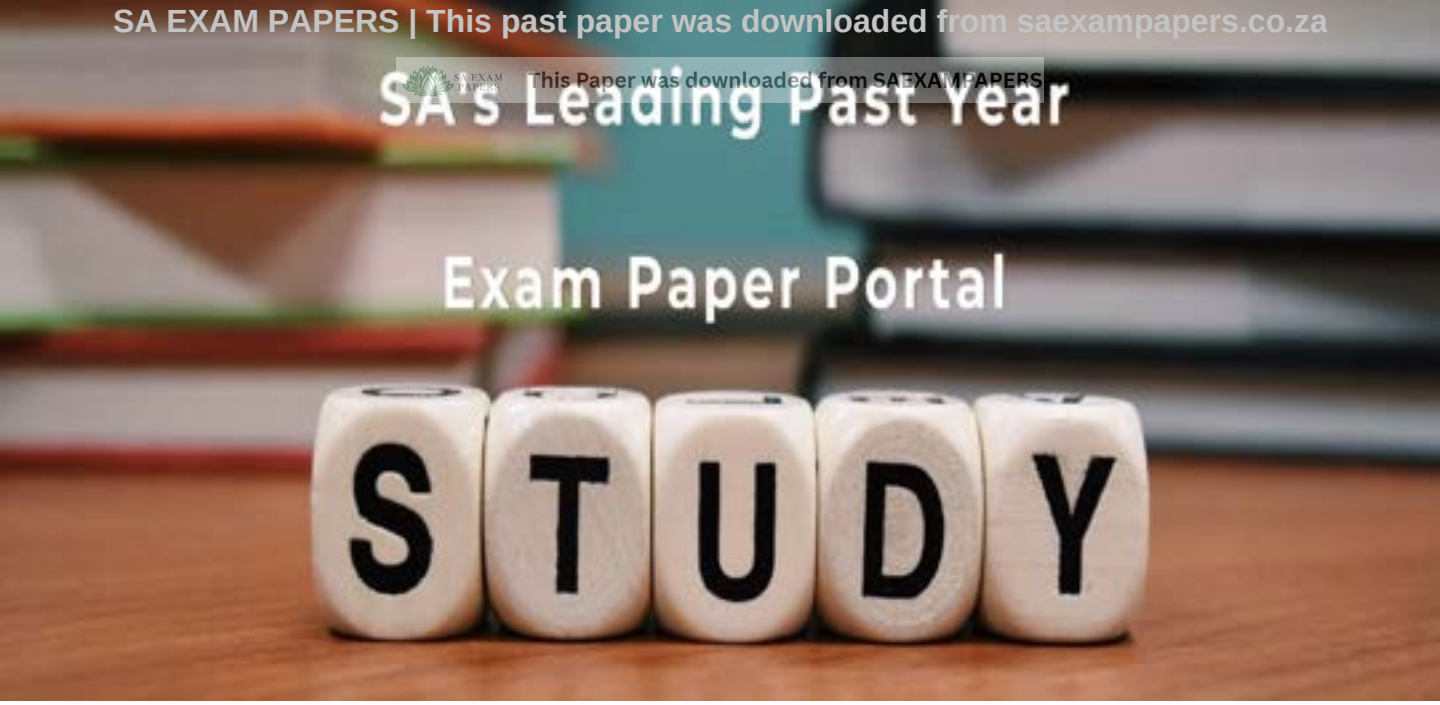


LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE / *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRADE* 12

MATHEMATICS P1/*WISKUNDE V1*

MARKING GUIDELINES/*NASIENRIGLYNE*

PRE – TRIAL EXAM 2025

MARKS/*PUNTE*: : 150

These marking guidelines consist of 16 pages/ *Hierdie nasienriglyne bestaan uit 16 bladsye*

NOTE/*NOTA*:

- If a candidate answers a question TWICE, only mark the FIRST attempt/ *As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging*
- Consistent accuracy applies in ALL aspects of the marking guidelines/ *Konsekwente akkuraatheid is van toepassing in ALLE aspekte van die nasienriglyne*

QUESTION 1 / *VRAAG 1*

1.1	1.1.1	$x(x+3)=0$ $x=0$ or $x=-3$	✓ $x=0$ ✓ $x=-3$	(2)
	1.1.2	$3x^2-4x=5$ $3x^2-4x-5=0$ $x=\frac{-(-4)\pm\sqrt{(-4)^2-4(3)(-5)}}{2(3)}$ $x=\frac{4\pm\sqrt{76}}{6}$ $x=2,12$ or $x=-0,79$	✓standard form/*standaard vorm* ✓substitution/*vervanging* ✓ $x=2.12$ ✓ $x=-0,79$	(4)
	1.1.3	$\sqrt{5-x}=1+x$ $\left(\sqrt{5-x}\right)^2=(1+x)^2$ $5-x=x^2+2x+1$ $x^2+3x-4=0$ $(x+4)(x-1)=0$ $\therefore x\neq -4$ or $x=1$	✓squaring /*vierkant* ✓ simplification/ *vereenvoudig* ✓ standard form/*standaard vorm* ✓ x – values/*waardes* ✓ $x=1$	(5)

	1.2	$x^2+y^2=13xy+9$ .....(1) $y-x=3$ .....(2) $y=x+3$ $x^2+(x+3)^2=13x(x+3)+9$ $x^2+x^2+6x+9=13x^2+39x+9$ $11x^2+33x=0$ $11x(x+3)=0$ $\therefore x=0$ or $x=-3$ $y=3$ or $y=0$ **OR** $x^2+y^2=13xy+9$ .....(1) $y-x=3$ .....(2) $x=y-3$ $(y-3)^2+y^2=13x(y-3)+9$ $y^2-6y+9=13y^2-39y+9$ $2y^2-6y+9=13y^2-39y+9$ $11y^2-33y=0$ $11y(y-3)=0$ $\therefore y=0$ or $y=3$ $x=-3$ or $x=0$	✓ $y=x+3$ ✓ substitution/*vervanging* ✓ simplification/ *vereenvoudig* ✓ standard form/*standaard vorm* ✓ factorization/ faktorisering ✓ x – values/*waardes* ✓ y – values/*waardes* **OR** ✓ $y=x+3$ ✓ substitution/*vervanging* ✓ simplification/ *vereenvoudig* ✓ standard form/*standaard vorm* ✓factorization/ faktorisering ✓ y– values/*waardes* ✓ x – values/*waardes*	(7) (7)

1.3		$\sqrt[3]{\frac{49^{1010}+7^{2019}}{7^{2019}}}$ $=\sqrt[3]{\frac{7^{2(1010)}+7^{2019}}{7^{2019}}}$ $=\sqrt[3]{\frac{7^{2020}+7^{2019}}{7^{2019}}}$ $=\sqrt[3]{\frac{7^{2019}(7+1)}{7^{2019}}}$ $=\sqrt[3]{8}$ $=\left(2^3\right)^{1/3}$ $=2$	✓exponential form/*eksponensiale vorm* ✓ simplification/ *vereenvoudig* ✓commonfactor/*gemeenskfaktor* ✓ answer/*antwoord*	(4)

QUESTION 2/ *VRAAG 2*

2.1	2.1.1	16 22 28 6 6 $d = 6$ $T_n = a + (n-1)d$ $= 16 + (n-1)6$ $= 6n + 10$	✓ $d = 6$ ✓ substitution/*vervanging* ✓ answer/*antwoord*	(3)
	2.1.2	$T_n = 6n + 10$ $T_{100} = 6(100) + 10$ $= 610$	✓ substitution/*vervanging* ✓ answer/*antwoord*	(2)
	2.1.3	$T_n = 310$ $6n + 10 = 310$ $6n = 300$ $n = 50$	✓ equating/*gelykstel* ✓ substitution/*vervanging* ✓ answer/*antwoord*	(3)
2.2	2.2.1	$8 \quad x \quad -4 \quad x-24$ $x-8 \quad -4-x \quad x-20$ $4-2x \quad 2x-16$ $-2x+4 = 2x-16$ $-2x-2x = -16-4$ $-4x = -20$ $x = 5$	✓ second difference/*2e verskil* ✓ equating/*gelykstel* ✓ $x = 5$	(3)

	2.2.2	$T_n = -6n + 3$ $s_n = \frac{n}{2}[-3 + (-6n + 3)]$ $-300 = -6n^2$ $-50 = -6n^2$ $7.07 = n$ $\therefore n > 0$ $\therefore s_n < 300 \qquad \therefore n = 7$	✓ $T_n = -6n + 3$ ✓ $s_n = \frac{n}{2}[-3 + (-6n + 3]$ ✓ $-300 = -6n^2$ ✓ $\therefore n = 7$	(4)

QUESTION 3/ *VRAAG 3*

3.1	$4\ ;\ \frac{4}{5}x\ ;\ \frac{4}{25}x^2$	✓ answer/*antwoord*	(1)
3.2	$-1 < r < 1$ $-1 < \frac{x}{5} < 1$ $-5 < x < 5$	✓ substitution/*vervanging* ✓ answer/*antwoord*	(2)
3.3	$S_\infty = \frac{a}{1-r}$ $= \frac{4}{1-\frac{x}{5}}$ $= \frac{20}{5-x}$	✓ $\frac{x}{5}$ ✓ substitution/*vervanging* ✓ answer/*antwoord*	(3)
3.4	$S_\infty - S_n < 0,0001 \qquad S_\infty = 5 \text{ if } x = 1$ $5 - \frac{4\left[1-\left(\frac{1}{5}\right)^n\right]}{1-\frac{1}{5}} < 0,0001$ $4 - 4 + 4(0,2)^n < 0,00008$ $\frac{4(0,2)^n}{4} < \frac{0,00008}{4}$ $(0,2)^n < 0,00002$ $n > \frac{\log 0,00002}{\log 0,2}$ The smallest $n > 7$	✓ method /*metode* ✓ substitution/*vervanging* ✓ simplification/ *vereenvoudig* ✓ $(0,2)^n < 0,00002$ ✓ answer/*antwoord*	(5)

QUESTION 4/ *VRAAG 4*

4.1	4.1.1	$g(x)=x^2+2x-15=0$ $(x+5)(x-3)=0$ $\therefore x=-5 \quad \text{or} \quad x=3$ $A(-5;0) \; ; \; B(3;0)$ $f(x)=x+5$ $=0+5$ $=5$ $\therefore K(0;5)$	✓factors/*faktor* ✓ x – values/*waardes* ✓ $K(0;5)$	(3)
	4.1.2	$g(x)=-x^2-2x+15$ $g(0)=15$ $D(0;15)$	✓ $D(0;15)$	(1)
	4.1.3	$x=\frac{-b}{2a}=\frac{-(-2)}{2(-1)}$ $=-1$ $g(-1)=-(-1)^2-2(-1)+15$ $=18$ $E(-1;18)$	✓ answer/*antwoord* ✓ answer/*antwoord* ✓substitution/*vervanging* ✓ answer/*antwoord*	(4)
4.2		$EL=-x^2-2x+15-(x+5)$ $=-x^2-2x+15-x-5$ $=-(-1)^2-3(-1)+10$ $=12$ units	✓ equating/*gelykstel* ✓substitution/*vervanging* ✓substitution/*vervanging* ✓ answer/*antwoord*	(4)
4.3		$y \le 5; y \in R$	✓ answer/*antwoord*	(1)
4.4		$-5<x<3$	✓✓ answer/*antwoord*	(2)

4.5		$-x^2-2x+15=x+5$ $-x^2-3x+10=0$ $x^2+3x-10=0$ $(x+5)(x-2)=0$ $x=-5 \quad \text{or} \quad x=2$ $f(2)=2+5$ $=7$	✓ equating/*gelykstel* ✓ simplification/ *vereenvoudig* ✓ standard form/*standaard vorm* ✓ x – values/*waardes* ✓ answer/*antwoord*	(5)

QUESTION 5/ *VRAAG 5*

5.1	$k=4$ $d=5$ $p=2$	✓ $k=4$ ✓ $d=5$ ✓ $p=2$	(3)
5.2	$y=\frac{5-x}{x-2}$ $x-2\overline{)-x+5}$ $\quad -1$ $\quad\quad \frac{-x+2}{3}$ $\therefore y=\frac{3}{x-2}-1$ **OR** $y=\frac{5-x}{x-2}$ $y=\frac{-(x-2)+3}{x-2}$ $y=\frac{3}{x-2}-1$	✓ method /*metode* ✓ answer/*antwoord* **OR** ✓ method /*metode* ✓ answer/*antwoord*	(2) (2)

5.3	$y = x - 3$ at C(5; 0) for x - value for y - value $y = 5 - 3$ $0 = x - 3$ $y = 2$ $x = 3$ $\therefore$ C$'$(3; 2) **OR** C$'$(0 + 3)(5 − 3) $\therefore$ C$'$(3; 2)	✓ method /*metode* ✓ answer/*antwoord* **OR** ✓ method /*metode* ✓ answer/*antwoord*	(2)
5.4	$f(x) = -1$ $\log_4 x = -1$ $x = 4^{-1}$ $x = \frac{1}{4}$ $f(x) = 1$ $\log_4 x = 1$ $x = 4$ $\therefore \frac{1}{4} \le x \le 4$	✓ $x = \frac{1}{4}$ and $x = 4$ ✓ $\frac{1}{4} \le x \le 4$	(2)
5.5	$f(x) = \log_4 x$ $4^y = x$ $y = 4^x$ $\therefore f^{-1}(x) = 4^x$	✓ $4^y = x$ ✓ answer/*antwoord*	(2)
5.6	Domain of $f^{-1}: x \in R$	✓ answer/*antwoord*	(1)
5.7	$1 \le x < 2$ **OR** $[1; 2)$	✓ answer/*antwoord*	(1)

QUESTION 6/ *VRAAG 6*

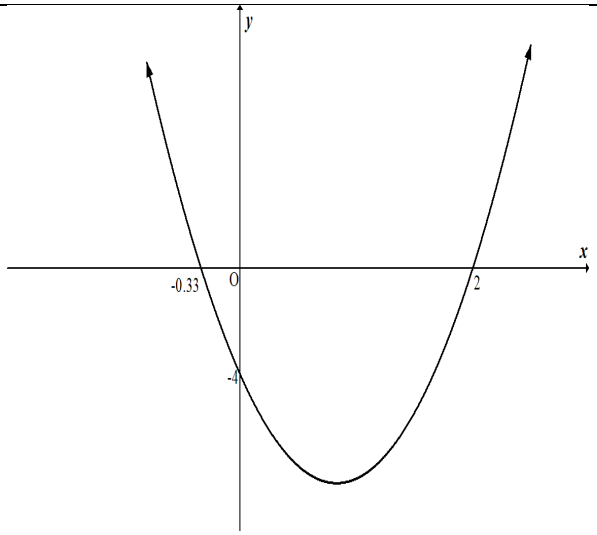
6.1		$A = P(1+i)^n$ $650\,000 = P(1-0,15)^5$ $P = \frac{650\,000}{(1-0,15)^5}$ $= 1\,464\,936,26$	✓substitution/*vervangi ng* ✓ simplification/ *vereenvoudig* ✓ answer/*antwoord*	(3)
6.2		$A = P(1+i)^n \qquad A = P(1+in)$ $x\left(1+\frac{0,08}{12}\right)^{6\times12} = (90\,000-x)(1+0,09\times6)$ $1,61350216x = 138\,600 - 1,54x$ $3,153502167x = 138\,600$ $x = R43\,951,14$ $R43\,951,14$ for compound interest and $R46\,048,86$ for simple interest	✓substitution/*vervangi ng* ✓substitution/*vervangi ng* ✓ simplification/ *vereenvoudig* ✓ answer/*antwoord* ✓ answer/*antwoord*	(5)
	6.3.1	$P = \frac{x\left[1-(1+i)^{-n}\right]}{i}$ $5\,000\,000 = \frac{40\,000\left[1-\left(1+\frac{0,085}{12}\right)^{-n}\right]}{\frac{0,085}{12}}$ $\frac{5\,000\,000}{40\,000}\times\frac{0,085}{12} = \left[1-\left(1+\frac{0,085}{12}\right)^{-n}\right]$ $\frac{11}{96} = \left(\frac{2417}{2400}\right)^{-n}$ $-n = \log_{\left(\frac{2417}{2400}\right)}\left(\frac{11}{96}\right)$ $-n = -306,9341289$ He will be paid for 307 months	✓ $\frac{0,085}{12}$ ✓substitution/*vervangi ng* ✓ simplification/ *vereenvoudig* ✓ correct use of logs/ *korrekte gebruik van logs* ✓ answer/*antwoord*	(5)

	6.3.2	$Pv = \frac{x\left[1-(1+i)^{-n}\right]}{i}$ $= \frac{40\,000\left[1-\left(1+\frac{0,085}{12}\right)^{-0,9341289}\right]}{\frac{0,085}{12}}$ $= R37110,96$ **OR** $B = A - Fv$ $= P(1+i)^n - \left[\frac{x\left[(1+i)^n-1\right]}{i}\right]$ $= 5\,000\,000\left(1+\frac{0,085}{12}\right)^{306} - \left[\frac{40\,000\left[\left(1+\frac{0,085}{12}\right)^{306}-1\right]}{\frac{0,085}{12}}\right]$ $= R37110,96$	✓ value of *n*/*waarde van n* ✓substitution/*vervangi ng* ✓ answer/*antwoord* **OR** ✓ value of *n*/*waarde van n* ✓substitution/*vervangi ng* ✓ answer/*antwoord*	(3)

QUESTION 7/ *VRAAG 7*

7.1		$f(x)=5x^2$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $=\lim_{h\to 0}\frac{5(x+h)^2-5x^2}{h}$ $=\lim_{h\to 0}\frac{5(x^2+2xh+h^2)-5x^2}{h}$ $=\lim_{h\to 0}\frac{5x^2+10xh+5h^2-5x^2}{h}$ $=\lim_{h\to 0}\frac{h(10x+5h)}{h}$ $=\lim_{h\to 0}10x+5h$ $=10x$	✓ $5(x+h)^2$ ✓ simplification/ *vereenvoudig* ✓ common factor/*gemeensk faktor* ✓ $\lim_{h\to 0}10x+5h$ ✓ answer/*antwoord*	(5)
7.2	7.2.1	$f(x)=3x^3-5x+\sqrt{x^2}$ $f(x)=3x^3-5x+x$ $f'(x)=9x^2-4$	✓ x ✓ $9x^2$ ✓ -4	(3)
	7.2.2	$y=\frac{x^2-2x-8}{x-4}$ $=\frac{(x-4)(x+2)}{x-4}$ $=x+2$ $\frac{dy}{dx}=1$	✓ $\frac{(x-4)(x+2)}{x-4}$ ✓ $x+2$ ✓ 1	(3)
	7.2.3	$f(x)=x^3-\frac{3}{\sqrt[3]{x^2}}$ $=x^3-3x^{-\frac{2}{3}}$ $f'(x)=3x^2+\frac{2}{x^{\frac{5}{3}}}$	✓ $\frac{3}{\sqrt[3]{x^2}}$ ✓ $3x^2$ ✓ $\frac{2}{x^{\frac{5}{3}}}$	(3)

QUESTION 8/ *VRAAG 8*

8.1	$f(x)=(2x-1)(x^2-2x-3)$ $=2x^3-4x^2-6x-x^2+2x+3$ $=2x^3-5x^2-4x+3$ $f'(x)=6x^2-10x-4$ $x=2 \quad \text{or} \quad x\neq -\frac{1}{3}$ $y=2(2)^3-5(2)^2-4(2)+3$ $=-9$ $A(2;-9)$	✓ $f(x)=2x^3-5x^2-4x+3$ ✓ $f'(x)=6x^2-10x-4$ ✓ $x=2 \quad \text{or} \quad x\neq -\frac{1}{3}$ ✓ $y=-9$ ✓ $A(2;-9)$	(5)
8.2	$f'(x)=6x^2-10x-4$ $f''(x)=0$ $12x-10=0$ $x=\frac{5}{6}$	✓$12x-10=0$ ✓ answer/*antwoord*	(2)
8.3		✓ shape/*vorm2* ✓intercepts / *onderskep*	(2)
8.4	$-\frac{1}{3}\leq x\leq 2$	✓✓ answer/*antwoord*	(2)

8.5	$PQ = 3x+1-(2x^3-5x^2-4x+3)$ $= 3x+1-2x^3+5x^2+4x-3$ $= -2x^3+5x^2+7x-2$ $PQ'(x) = 0$ $-6x^2+10x+7=0$ $6x^2-10x-7=0$ $x = \frac{-(-10)\pm\sqrt{(-10)^2-4(6)(-7)}}{12}$ $x = 2,2$ or $x \neq -0,53$	✓ $PQ = 3x+1-(2x^3-5x^2-4x+3)$ ✓ $PQ'(x) = -6x^2+10x+7$ ✓ $x = \frac{-(-10)\pm\sqrt{(-10)^2-4(6)(-7)}}{12}$ ✓ $x = 2,2$	(4)

QUESTION 9/ *VRAAG 9*

9.1		$V(x) = x(40-2x)(60-2x)$ $= x(2400-120x-80x+4x^2)$ $= 4x^3-200x^2+2400x$	✓ $x(40-2x)(60-2x)$ ✓ simplification/ *vereenvoudig*	(2)
9.2		$V'(x) = 12x^2-400x+2400$ $12x^2-400x+2400=0$ $x = 25,49$ or $x = 7,85$ maximum : $x = 7,85$	✓$12x^2-400x+2400$ ✓ $V'(x)=0$ ✓ x – values/*waardes* ✓ answer/*antwoord*	(4)

QUESTION 10/ *VRAAG 10*

10.1		Choosing between motorcycle and a bicycle are mutually exclusive events i.e. $P(M \text{ and } B) = 0$ $P(M \text{ or } B) = P(M) + P(B)$ $= 0,44 + 0,55$ $= 0,99$	✓ $P(M \text{ and } B) = 0$ ✓ answer/*antwoord*	(2)
10.2	10.2.1	$P(EM) = 0,35$	✓ answer/*antwoord*	(1)
	10.2.2	$P(SB) = 0,75$	✓ answer/*antwoord*	(1)
	10.2.3	$P(EM \text{ and } SB) = P(EM) \times P(SB)$ $0,2 = 0,35 \times 0,75$ $0,2 = 0,26$ $0,2 \neq 0,3$ Therefore, classmate excellence in Maths is NOT independent of being a bystander.	✓ substitution/*vervanging* ✓ $0,2 \neq 0,3$ ✓ reasoning/*redenasie*	(3)
10.3	10.3.1	$= \frac{11!}{2! \times 3! \times 2!}$ $= 1\,663\,200$	✓ $\frac{11!}{2! \times 3! \times 2!}$ ✓ answer/*antwoord*	(2)
	10.3.2	$= 2\left(\frac{9!}{3! \times 2!}\right) + \frac{9!}{2! \times 2!}$ $= 60\,480 + 90\,720$ $= 151\,200$	✓✓ $2\left(\frac{9!}{3! \times 2!}\right)$ ✓ $\frac{9!}{2! \times 2!}$ ✓ answer/*antwoord*	(4)
10.4		$= 11 \times 10 \times 9 \times 27 \times 26$ $= 694\,980$	✓ $11 \times 10 \times 9$ ✓ 27×26 ✓ answer/*antwoord*	(3)