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*
SEPTEMBER 2025

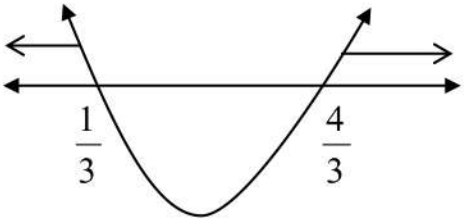
MARKS/*PUNTE*: 150

This marking guidelines consists of 14 pages/ ***Hierdie nasienriglyne bestaan uit 14 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	$(3x+1)(x-2)=0$ $x=-\frac{1}{3}$ or / *of* $x=2$	✓ $x=-\frac{1}{3}$ ✓ $x=2$	(2)
	1.1.2	$5x(x-2)=2$ $5x^2-10x-2=0$ $x=\frac{-(-10)\pm\sqrt{(-10)^2-4(5)(-2)}}{2(5)}$ $x=\frac{10\pm\sqrt{140}}{10}$ $x=2{,}18$ or / *of* $x=-0{,}18$	✓standard form/*standaard vorm* ✓substitution/*vervanging* ✓ $x=2.18$ ✓ $x=-0{,}18$	(4)
	1.1.3	$(3x-2)^2>3x$ $9x^2-12x+4-3x>0$ $9x^2-15x+4>0$ $(3x-1)(3x-4)>0$ CV / *KW* : $x=\frac{1}{3}$ or / *of* $x=\frac{4}{3}$  $x<\frac{1}{3}$ or / *of* $x>\frac{4}{3}$	✓standard form/*standaard vorm* ✓critical values/*kritieke waardes* ✓ $x<\frac{1}{3}$ ✓ $x>\frac{4}{3}$	(4)

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	1.1.4	$x-7=\sqrt{x-5}$ $(x-7)^2=x-5$ $x^2-14x+49=x-5$ $x^2-15x+54=0$ $(x-6)(x-9)=0$ $x\neq 6$ or / *of* $x=9$	✓squaring/*vierkant* ✓standard form/*standaard vorm* ✓ $x\neq 6$ ✓ $x=9$	(4)
	1.1.5	$3^{2x}-12.3^x+27=0$ $(3^x-3)(3^x-9)=0$ $3^x=3$ or $3^x=3^2$ $x=1$ or $x=2$	✓standard form /*standaard vorm* ✓ $x=1$ ✓ $x=2$	(3)
1.2	$3^y=9^{x-3}$ $y^2=20-x^2$ $3^y=(3)^{2x-6}$ $y=2x-6$ $(2x-6)^2=20-x^2$ $4x^2-24x+36=20-x^2$ $5x^2-24x+16=0$ $(5x-4)(x-4)=0$ $x=\frac{4}{5}$ or / *of* $x=4$ $y=\frac{-22}{5}$ or / *of* $y=2$	✓ $3^y=(3)^{2x-6}$ ✓ $y=2x-6$ ✓substitution/*vervanging* ✓standard form/*standaard vorm* ✓ x – values/*waardes* ✓ y – values/*waardes*	(6)
1.3	$n=\log_2 y$ $y=2^n$ 50^{n+1} $=50^n.50$ $=(5\times 2\times 5)^n.50$ $=50.5^n.2^n.5^n$ $=50x^2y$	✓ $y=2^n$ ✓ $50^n.50$ ✓ $50.5^n.2^n.5^n$ ✓ answer/*antwoord*	(4)
				[27]

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QUESTION 2/*VRAAG 2*

2.1	2.1.1	12 ; 16 ; 20	✓answer/*antwoord*	(1)
	2.1.2	$a=-4$ $d=4$ $T_n=-4+(n-1)4$ $=-4+4n-4$ $=4n-8$	✓ $d=4$ ✓answer/*antwoord*	(2)
	2.1.3	$4n-8=56$ $4n=64$ $n=16$	✓equating/*gelykstel* ✓answer/*antwoord*	(2)
	2.1.4	$T_{12}=-4+11(4)$ $=40$	✓answer/*antwoord*	(1)
2.2	2.2.1	$x \quad y \quad 2 \quad -2 \quad -8 \quad -16$ $y-x \quad 2-y \quad -4 \quad -6 \quad -8$ $-2 \quad -2 \quad -2 \quad -2$ $-4-(2-y)=-2$ $-4-2+y=-2$ $y=4$ $2-y-(y-x)=-2$ $2-4-4+x=-2$ $x=4$	✓second difference/*2e verskil* ✓equating/*gelykstel* ✓y – value/*waarde* ✓equating/*gelykstel* ✓x – values/*waarde*	(5)
	2.2.2	$2a=-2$ $a=-1$ $3(-1)+b=0$ $b=3$ $-1+3+c=4$ $c=2$ $T_n=-n^2+3n+2$	✓value of a /*waarde van a* ✓substitution/*vervanging* ✓value of b /*waarde van b* ✓substitution/*vervanging* ✓value of c / *waarde van c*	(5)
				[16]

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QUESTION 3/*VRAAG 3*

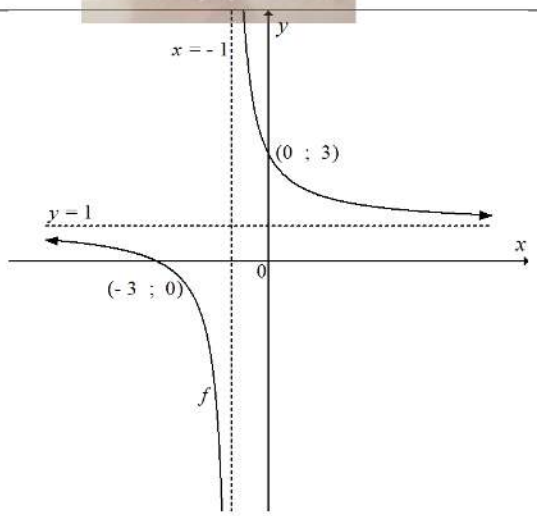
3.1	$3(2)^5 + 3(2)^4 + 3(2)^3 + \ldots\ldots\ldots\ldots$ $r = \frac{3(2)^4}{3(2)^5} = \frac{1}{2}$ $-1 < r < 1$ the series converges / *reeks konvergeer*	✓value of r / *waarde van r* ✓reasoning/*redenasie*	(2)
3.2	$S_n = \frac{a\left(1-r^n\right)}{1-r}$ $S_7 = \frac{3(2)^5\left[1-\left(\frac{1}{2}\right)^7\right]}{1-\frac{1}{2}}$ $= \frac{381}{2}$ $= 190,5$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
3.3	$S_\infty = \frac{a}{1-r}$ $= \frac{3(2)^5}{1-\frac{1}{2}}$ $= 192$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
3.4	$\sum_{k=8}^{\infty} 3(2)^{6-k}$ $= S_\infty - S_7$ $= 192 - 190,5$ $= 1,5$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
			[8]

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QUESTION 4/*VRAAG 4*

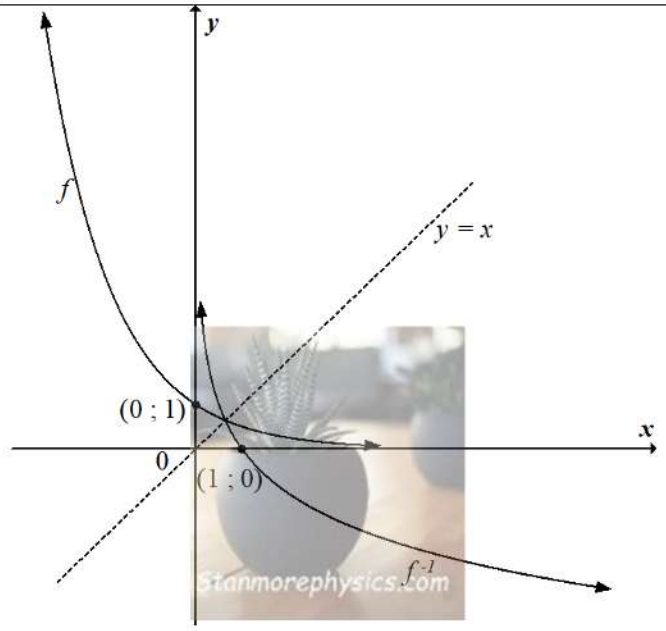
4.1	4.1.1	x - intercept/*afsnit* (y = 0) $-x^2-4x+5=0$ $x^2+4x-5=0$ $(x+5)(x-1)=0$ $x=-5$ or / *of* $x=1$ E$(-5;0)$ P$(1;0)$	✓equating to 0/*gelykstel aan 0* ✓ $x=-5$ ✓ $x=1$	(3)
	4.1.2	$y=mx+c$ $y=mx+5$ passing through / *gaan deur* E$(-5;0)$ $m(-5)+5=0$ $-5m=-5$ $m=1$ $y=x+5$	✓ $c=5$ ✓ $m=1$	(2)
	4.1.3	$f'(x)=0$ **OR** $x=-\frac{b}{2a}$ $-2x-4=0$ $=-\frac{(-4)}{2(-1)}$ $x=-2$ $x=-2$ $f(-2)=9$ $y=x+5$ $=-2+5$ $=3$ T$(-2;3)\therefore$ DT = 3 units NT $=9-3$ $=6$ units	✓ $f'(x)=-2x-4$ **OR** $=-\frac{(-4)}{2(-1)}$ ✓ $x=-2$ ✓ $f(-2)=9$ ✓ $y=3$ ✓ DT = 3 units/*eenhede* ✓ NT = 6 units/*eenhede*	(6)

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	4.1.4	$-x^2-4x+5=5$ $-x^2-4x=0$ $-x(x+4)=0$ $x=0$ or / *of* $x=-4$ $S(-4;5)$	✓equating/*gelykstel* ✓ $x=-4$	(2)
4.2	4.2.1	$f(x)=\frac{(x+1)+2}{x+1}=\frac{x+1}{x+1}+\frac{2}{x+1}$ $=\frac{2}{x+1}+1$	✓ $f(x)=\frac{(x+1)+2}{x+1}$ ✓ $f(x)=\frac{x+1}{x+1}+\frac{2}{x+1}$	(2)
	4.2.2	x - intercept/*afsnit*: $\frac{x+3}{x+1}=0$ $\therefore x=-3$ y - intercept/*afsnit*: $=\frac{0+3}{0+1}$ $\therefore y=3$	✓ $\frac{x+3}{x+1}=0$ ✓ $x=-3$ ✓ $y=\frac{0+3}{0+1}$ ✓ $y=3$	(4)
	4.2.3	Axis of symmetry / *Simmetrie – as*: $y=-(x+1)+1$ $\therefore y=-x$	✓ $y=-(x+1)+1$ ✓ $y=-x$	(2)
	4.2.4		✓shape/*vorm* ✓asymptotes/*asimptote* ✓intercepts/*afsnitte*	(3)
	4.2.5	$x\leq -3$ or $x>-1$	✓ $x\leq -3$ ✓ $x>-1$	(2)
				[26]

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QUESTION 5/*VRAAG 5*

5.1	$y = 2^{-x}$ $x = 2^{-y}$ $-y = \log_2 x$ $y = -\log_2 x$ or $y = \log_2 x^{-1}$ or $y = \log_2 \frac{1}{x}$	✓interchange x and y / *ruil x en y* ✓equation	(2)
5.2		Graph of f / *grafiek van f* ✓shape/*vorm* ✓(0 ; 1) Graph of f^{-1}/*grafiek van* f^{-1} ✓shape/*vorm* ✓(1 ; 0)	(4)
5.3	$x \in [0 ; \infty)$ ***OR*** $x > 0$	✓answer/*antwoord*	(1)
			[7]

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QUESTION 6/*VRAAG 6*

6.1	$1+i_{eff}=\left(1+\frac{i^m}{m}\right)^m$ $1+i_{eff}=\left(1+\frac{0,08}{12}\right)^{12}$ $i_{eff}=0,08299950681$ $i_{eff}=8,3\%$	✓substitution/*vervanging* ✓ Rate/*koers* $=8,3\%$	(2)
6.2	$P_v=\frac{x\left[1-(1+i)^{-n}\right]}{i}$ $375\,000=\frac{7\ 000\left[1-\left(1+\frac{0,08}{12}\right)^{-n}\right]}{\frac{0,08}{12}}$ $\frac{9}{14}=\left(\frac{151}{150}\right)^{-n}$ $n=-\frac{\log\left(\frac{9}{14}\right)}{\log\left(\frac{151}{150}\right)}$ $n=66,495\,584\,57$ $n=66,5$ months	✓substitution/*vervanging* ✓ $\frac{0,08}{12}$ ✓ simplification/ *vereenvoudig* ✓correct use of logs/ *korrekte gebruik van logs* ✓ answer/*antwoord*	(5)

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6.3	$P_v = \dfrac{7\,000\left[1-\left(1+\dfrac{0,08}{12}\right)^{-0,49558457}\right]}{\dfrac{0,08}{12}}\left(1+\dfrac{0,08}{12}\right)$ $= \text{R}3\,474,91$ **OR** $\left[375\,000-\dfrac{7\,000\left[1-\left(1+\dfrac{0,08}{12}\right)^{-66}\right]}{\dfrac{0,08}{12}}\right]\left(1+\dfrac{0,08}{12}\right)^{67}$ $= \text{R}3\,474,91$	✓value of *n*/*waarde van n* ✓substitution/*vervanging* ✓multiply/ *vermenigvuldig* $\left(1+\dfrac{0,08}{12}\right)$ ✓ answer/*antwoord* ✓value of *n*/*waarde van n* ✓substitution/*vervanging* ✓ multiply/ *vermenigvuldig* $\left(1+\dfrac{0,08}{12}\right)$ ✓ answer/*antwoord*	(4)
6.4	$\text{A} = \text{P}(1-i)^n$ $270\,000 = 375\,000(1-i)^4$ $(1-i)^4 = \dfrac{270\,000}{375\,000}$ $i = 1-\sqrt[4]{\dfrac{270\,000}{375\,000}}$ $i = 7,9\%$	✓substitution/*vervanging* ✓ simplification/ *vereenvoudig* ✓answer/*antwoord*	(3)
			[14]

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QUESTION 7/*VRAAG 7*

7.1		$f(x)=x^2-3x$ $f'(x)=\lim\limits_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$ $=\lim\limits_{h\to 0}\dfrac{(x+h)^2-3(x+h)-(x^2-3x)}{h}$ $=\lim\limits_{h\to 0}\dfrac{x^2+2xh+h^2-3x-3h-x^2+3x}{h}$ $=\lim\limits_{h\to 0}\dfrac{2xh+h^2-3h}{h}$ $=\lim\limits_{h\to 0}\dfrac{h(2x+h-3)}{h}$ $=\lim\limits_{h\to 0}\dfrac{2x+h-3}{h}$ $=2x-3$	✓ $f(x+h)=(x+h)^2-3(x+h)$ ✓ $-x^2+3x$ ✓simplification/*vereenvoudig* ✓common factor/*gemeensk faktor* ✓answer/*antwoord*	(5)
7.2	7.2.1	$D_x\left[(x+1)(5x+9)\right]$ $=D_x\left[5x^2+9x+5x+9\right]$ $=D_x\left[5x^2+14x+9\right]$ $=10x+14$	✓simplification/*vereenvoudig* ✓$10x$ ✓14	(3)
	7.2.2	$y=\dfrac{-5}{\sqrt{x}}-x^5$ $=-5x^{-\frac{1}{2}}-x^5$ $\dfrac{dy}{dx}=\dfrac{5}{2}x^{-\frac{3}{2}}-5x^4$	✓$-5x^{-\frac{1}{2}}$ ✓$\dfrac{5}{2}x^{-\frac{3}{2}}$ ✓$-5x^4$	(3)
	7.2.3	$f(x)=\dfrac{x^3+x^2-2x}{x-1}$ $=\dfrac{x(x^2+x-2)}{x-1}$ $=\dfrac{x(x+2)(x-1)}{x-1}$ $=x^2+2x$ $f'(x)=2x+2$	✓common factor/*gemeensk faktor* ✓x^2+2x ✓$2x$ ✓2	(4)
				[15]

QUESTION 8/*VRAAG 8*

8.1	$f(x)=x^3+bx^2+cx+4$ $f'(0)=0$ $f'(x)=3x^2+2bx+c$ $f'(0)=c$ $\therefore c=0$ x - intercept / *afsnit* ($y=0$) A$(-1;0)$ $\therefore x=-1$ $f(x)=x^3+bx^2+0+4$ $f(-1)=(-1)^3+b(-1)^2+0+4=0$ $-1+b+4=0$ $b=-3$ $f(x)=x^3-3x^2+4$	✓ $f'(x)$ ✓ $c=0$ ✓substitution/*vervanging* ✓ $b=-3$	(4)
8.2	Point of inflection / *Buigpunt* $f''(x)=0$ $6x-6=0$ $6x=6$ $x=1$ $f(1)=(1)^3-3(1)^2+4$ $=2$ $(1\ ;\ 2)$	✓ $f''(x)=0$ ✓ $x=1$ ✓substitution/*vervanging* ✓answer/*antwoord*	(4)

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8.3	$m = f'(3) = 3(3)^2 - 6(3)$ $= 9$ $\therefore$ equation of a tangent/*vergelyking raaklyn* $y = mx + c$ $y = 9x + c$ $f(3) = (3)^3 - 3(3)^2 + 4$ $= 4$ passing through/*gaan deur* $(3\,;4)$ $4 = 9(3) + c$ $c = -23$ $y = 9x - 23$	✓ $m = 9$ ✓ $f(3) = 4$ ✓substitution/*vervanging* ✓ $c = -23$	(4)
			[12]

QUESTION 9/*VRAAG 9*

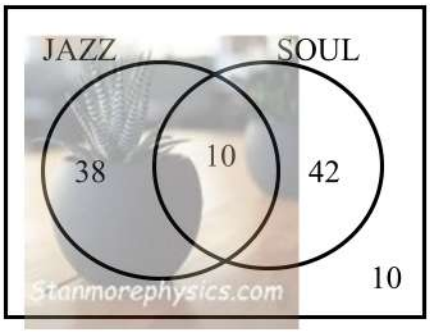
9.1	$x + h = 10$ $h = 10 - x$ $2y + 2x = 32$ $y + x = 16$ $y = 16 - x$ $A = \frac{1}{2}bh + lb$ $A(x) = \frac{1}{2}(x)(10 - x) + (x)(16 - x)$ $= 5x - \frac{x^2}{2} + 16x - x^2$ $= \frac{-3x^2}{2} + 21x$ $= -\frac{x}{2}(3x - 42)$	✓ $h = 10 - x$ ✓ $y = 16 - x$ ✓substitution/*vervanging* ✓ $\frac{-3x^2}{2} - 21x$	(4)

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9.2	$A(x)=\frac{-3x^2}{2}+21x$ $A'(x)=0$ $-3x+21=0$ $-3x=-21$ $x=7$	✓ $-3x+21=0$ ✓ $x=7$	(2)
9.3	Maximum Area / *maksimum oppervlakte* $A(x)=-\frac{1}{2}x(3x-42)$ $=-\frac{7}{2}[3(7)-42]$ $=-\frac{7}{2}[21-42]$ $=\frac{-7(-21)}{2}$ $=73,2$	✓substitution/*vervanging* ✓answer/*antwoord*	(2)
			[8]

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QUESTION 10/*VRAAG 10*

10.1	10.1.1	$P(A \text{ or / of } B) = P(A) + P(B) - P(A \text{ and / en } B)$ $0.625 = 0,25 + 0,5 - P(A \text{ and / en } B)$ $P(A \text{ and / en } B) = 0,125$	✓substitution/*vervanging* ✓ $P(A \text{ and / en } B) = 0,125$	(2)
	10.1.2	$P(A \text{ and / en } B) \neq 0$ $P(A \text{ and / en } B)$ are not mutually exclusive/ *is nie onderling uitsluitend nie.* Therefore event A and B are not complementary/*daarom is gebeurtenisse A en B nie komplementer nie*	✓ $P(A \text{ and / en } B) \neq 0$ ✓reasoning/*redenasie*	(2)
10.2	10.2.1	$48 - x + 52 - x + 10 + x = 100$ $100 - 2x + 10 + x = 100$ $x = 10$  	✓ $100 - 2x + 10 + x = 100$ ✓ $x = 10$ ✓38 ✓10 ✓42	(5)
	10.2.2	$P(soul) = \frac{52}{100} = \frac{13}{25} = 0,52$	✓ $\frac{13}{25}$	(1)
	10.2.3	$P\ (jazz \text{ or } soul) = \frac{48}{100} + \frac{52}{100} - \frac{10}{100} = \frac{9}{10}$	✓ $\frac{9}{10}$	(1)
10.3	10.3.1	$7 \times 8 \times 8 \times 8$ $= 3\,584$ ways/*maniere*	✓ $7 \times 8 \times 8 \times 8$ ✓answer/*antwoord*	(2)
	10.3.2	$7 \times 7 \times 6 \times 5$ $= 1\,470$ ways / *maniere*	✓ $7 \times 7 \times 6 \times 5$ ✓answer/*antwoord*	(2)
	10.3.3	$P(code \text{ divide by } 5) = \frac{7 \times 8 \times 8 \times 1}{3\,584} = \frac{448}{3\,584}$ $= \frac{1}{8} = 0,125$	✓ $\frac{7 \times 8 \times 8 \times 1}{3\,584}$ ✓answer/*antwoord*	(2)
				[17]

TOTAL/ *TOTAAL*: 150

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