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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*



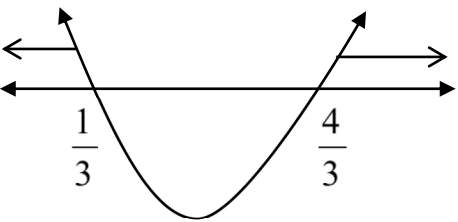
SA EXAM PAPERS

Proudly South African

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

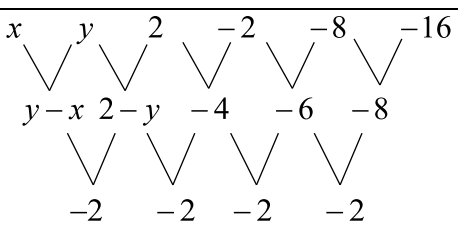
1.1	1.1.1	$(3x+1)(x-2)=0$ $x = -\frac{1}{3}$ or / of $x = 2$	$\checkmark x = -\frac{1}{3}$ $\checkmark x = 2$	(2)
	1.1.2	$5x(x-2)=2$ $5x^2-10x-2=0$ $x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(5)(-2)}}{2(5)}$ $x = \frac{10 \pm \sqrt{140}}{10}$ $x = 2,18$ or / of $x = -0,18$	$\checkmark$ standard form/ <i>standaard vorm</i> $\checkmark$ substitution/ <i>vervanging</i> $\checkmark x = 2,18$ $\checkmark x = -0,18$	(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 $x > \frac{4}{3}$	$\checkmark$ standard form/ <i>standaard vorm</i> $\checkmark$ critical values/ <i>kritieke waardes</i> $\checkmark x < \frac{1}{3}$ $\checkmark x > \frac{4}{3}$	(4)



	1.1.4	$x - 7 = \sqrt{x - 5}$ $(x - 7)^2 = x - 5$ $x^2 - 14x + 49 = x - 5$ $x^2 - 15x + 54 = 0$ $(x - 6)(x - 9) = 0$ $x \neq 6 \quad \text{or / of} \quad x = 9$	✓ squaring/ <i>vierkant</i> ✓ standard form/ <i>standaard vorm</i> ✓ $x \neq 6$ ✓ $x = 9$	(4)
	1.1.5	$3^{2x} - 12 \cdot 3^x + 27 = 0$ $(3^x - 3)(3^x - 9) = 0$ $3^x = 3 \quad \text{or} \quad 3^x = 3^2$ $x = 1 \quad \text{or} \quad x = 2$	✓ standard form / <i>standaard vorm</i> ✓ $x = 1$ ✓ $x = 2$	(3)
1.2		$3^y = 9^{x-3}$ $y^2 = 20 - x^2$ $3^y = (3)^{2x-6}$ $y = 2x - 6$ $(2x - 6)^2 = 20 - x^2$ $4x^2 - 24x + 36 = 20 - x^2$ $5x^2 - 24x + 16 = 0$ $(5x - 4)(x - 4) = 0$ $x = \frac{4}{5} \quad \text{or / of} \quad x = 4$ $y = \frac{-22}{5} \quad \text{or / of} \quad y = 2$	✓ $3^y = (3)^{2x-6}$ ✓ $y = 2x - 6$ ✓ substitution/ <i>vervang</i> ✓ standard form/ <i>standaard vorm</i> ✓ x – values/ <i>waardes</i> ✓ y – values/ <i>waardes</i>	(6)
1.3		$n = \log_2 y$ $y = 2^n$ 50^{n+1} $= 50^n \cdot 50$ $= (5 \times 2 \times 5)^n \cdot 50$ $= 50 \cdot 5^n \cdot 2^n \cdot 5^n$ $= 50x^2y$	✓ $y = 2^n$ ✓ $50^n \cdot 50$ ✓ $50 \cdot 5^n \cdot 2^n \cdot 5^n$ ✓ answer/ <i>antwoord</i>	(4)
				[27]



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	 $-4 - (2 - y) = -2$ $-4 - 2 + y = -2$ $y = 4$ $2 - y - (y - x) = -2$ $2 - 4 - 4 + x = -2$ $x = 4$	✓ 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]



QUESTION 3/VRAAG 3

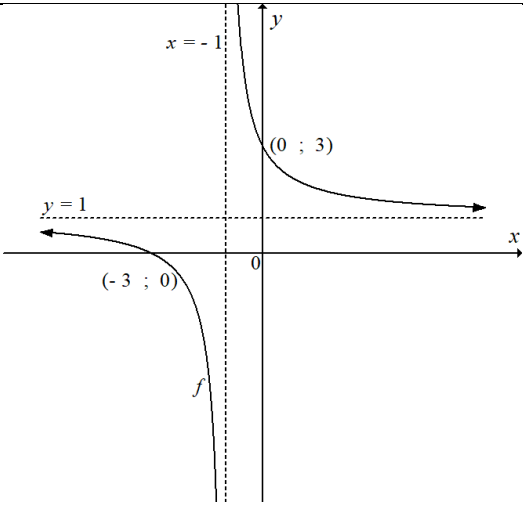
3.1	$3(2)^5 + 3(2)^4 + 3(2)^3 + \dots$ $r = \frac{3(2)^4}{3(2)^5} = \frac{1}{2}$ $-1 < r < 1$ the series converges / <i>reeks konvergeer</i>	✓ value of r / <i>waarde van r</i> ✓ reasoning/ <i>redenasie</i>	(2)
3.2	$S_n = \frac{a(1-r^n)}{1-r}$ $S_7 = \frac{3(2)^5 \left[1 - \left(\frac{1}{2} \right)^7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



QUESTION 4/VRAAG 4

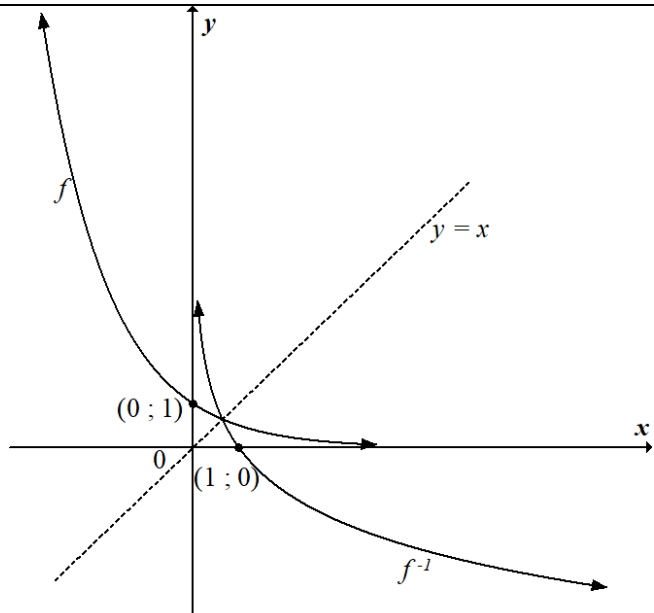
4.1	4.1.1	x - intercept/ <i>afsnit</i> ($y = 0$) $-x^2 - 4x + 5 = 0$ $x^2 + 4x - 5 = 0$ $(x + 5)(x - 1) = 0$ $x = -5$ or / <i>of</i> $x = 1$ $E(-5; 0)$ $P(1; 0)$	$\checkmark$ equating to 0/ <i>gelykstel aan 0</i> $\checkmark x = -5$ $\checkmark x = 1$	(3)
	4.1.2	$y = mx + c$ $y = mx + 5$ passing through / <i>gaan deur</i> $E(-5; 0)$ $m(-5) + 5 = 0$ $-5m = -5$ $m = 1$ $y = x + 5$	$\checkmark c = 5$ $\checkmark m = 1$	(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	$\checkmark$ $f'(x) = -2x - 4$ OR $= -\frac{(-4)}{2(-1)}$ $\checkmark x = -2$ $\checkmark f(-2) = 9$ $\checkmark y = 3$ $\checkmark DT = 3$ units/ <i>eenhede</i> $\checkmark NT = 6$ units/ <i>eenhede</i>	(6)



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



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 / <i>ruil x en y</i> ✓ equation	(2)
5.2		Graph of f / <i>grafiek van f</i> ✓ shape/vorm ✓ (0 ; 1) Graph of f^{-1} / <i>grafiek van f^{-1}</i> ✓ shape/vorm ✓ (1 ; 0)	(4)
5.3	$x \in [0 ; \infty)$ OR $x > 0$	✓ answer/antwoord	(1)
			[7]



QUESTION 6/VRAAG 6

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



6.3	$P_v = \frac{7\,000 \left[1 - \left(1 + \frac{0,08}{12} \right)^{-0,49558457} \right]}{\frac{0,08}{12}} \left(1 + \frac{0,08}{12} \right)$ $= R3\,474,91$ OR $\left[375\,000 - \frac{7\,000 \left[1 - \left(1 + \frac{0,08}{12} \right)^{-66} \right]}{\frac{0,08}{12}} \right] \left(1 + \frac{0,08}{12} \right)^{67}$ $= R3\,474,91$	✓ value of <i>n/waarde van n</i> ✓ substitution/ <i>vervanging</i> ✓ multiply/ <i>vermenigvuldig</i> $\left(1 + \frac{0,08}{12} \right)$ ✓ answer/ <i>antwoord</i>	
6.4	$A = P(1-i)^n$ $270\,000 = 375\,000(1-i)^4$ $(1-i)^4 = \frac{270\,000}{375\,000}$ $i = 1 - \sqrt[4]{\frac{270\,000}{375\,000}}$ $i = 7,9\%$	✓ substitution/ <i>vervanging</i> ✓ simplification/ <i>vereenvoudig</i> ✓ answer/ <i>antwoord</i>	(4)
			[14]



QUESTION 7/VRAAG 7

7.1		$f(x) = x^2 - 3x$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{(x+h)^2 - 3(x+h) - (x^2 - 3x)}{h}$ $= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - 3x - 3h - x^2 + 3x}{h}$ $= \lim_{h \rightarrow 0} \frac{2xh + h^2 - 3h}{h}$ $= \lim_{h \rightarrow 0} \frac{h(2x + h - 3)}{h}$ $= \lim_{h \rightarrow 0} \frac{2x + h - 3}{1}$ $= 2x - 3$	$\checkmark f(x+h) = (x+h)^2 - 3(x+h)$ $\checkmark -x^2 + 3x$ $\checkmark$ simplification/vereenvoudig $\checkmark$ common factor/gemeensk faktor $\checkmark$ answer/antwoord	(5)
7.2	7.2.1	$D_x [(x+1)(5x+9)]$ $= D_x [5x^2 + 9x + 5x + 9]$ $= D_x [5x^2 + 14x + 9]$ $= 10x + 14$	$\checkmark$ simplification/vereenvoudig $\checkmark 10x$ $\checkmark 14$	(3)
	7.2.2	$y = \frac{-5}{\sqrt{x}} - x^5$ $= -5x^{-\frac{1}{2}} - x^5$ $\frac{dy}{dx} = \frac{5}{2}x^{-\frac{3}{2}} - 5x^4$	$\checkmark -5x^{-\frac{1}{2}}$ $\checkmark \frac{5}{2}x^{-\frac{3}{2}}$ $\checkmark -5x^4$	(3)
	7.2.3	$f(x) = \frac{x^3 + x^2 - 2x}{x-1}$ $= \frac{x(x^2 + x - 2)}{x-1}$ $= \frac{x(x+2)(x-1)}{x-1}$ $= x^2 + 2x$ $f'(x) = 2x + 2$	$\checkmark$ common factor/gemeensk faktor $\checkmark x^2 + 2x$ $\checkmark 2x$ $\checkmark 2$	(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 / <i>afsnit</i> ($y = 0$) $A(-1; 0)$ $\therefore x = -1$ $f(x) = x^3 + bx^2 + 0 + 4$ $f(-1) = (-1)^3 + b(-1)^2 + 0 + 4 = 0$ $-1 + b + 4 = 0$ $b = -3$ $f(x) = x^3 - 3x^2 + 4$	$\checkmark f'(x)$ $\checkmark c = 0$ $\checkmark$ substitution/ <i>vervang</i> $\checkmark b = -3$	(4)
8.2	Point of inflection / <i>Buigpunt</i> $f''(x) = 0$ $6x - 6 = 0$ $6x = 6$ $x = 1$ $f(1) = (1)^3 - 3(1)^2 + 4$ $= 2$ $(1; 2)$	$\checkmark f''(x) = 0$ $\checkmark x = 1$ $\checkmark$ substitution/ <i>vervang</i> $\checkmark$ answer/ <i>antwoord</i>	(4)



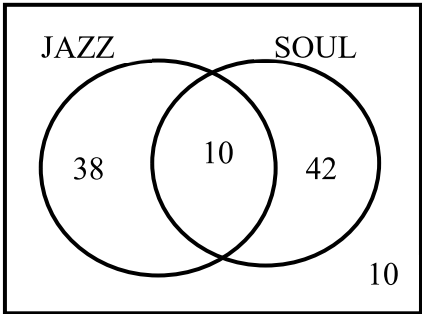
8.3	$m = f'(3) = 3(3)^2 - 6(3)$ $= 9$ $\therefore$ equation of a tangent/ <i>vergelyking raaklyn</i> $y = mx + c$ $y = 9x + c$ $f(3) = (3)^3 - 3(3)^2 + 4$ $= 4$ passing through/ <i>gaan deur</i> (3; 4) $4 = 9(3) + c$ $c = -23$ $y = 9x - 23$	$\checkmark m = 9$ $\checkmark f(3) = 4$ $\checkmark$ substitution/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

QUESTION 9/VRAAG 9

9.1	$x + h = 10$ $h = 10 - x$ $2y + 2x = 32$ $y + x = 16$ $y = 16 - x$ $A = \frac{1}{2}bh + lb$ $A(x) = \frac{1}{2}(x)(10 - x) + (x)(16 - x)$ $= 5x - \frac{x^2}{2} + 16x - x^2$ $= \frac{-3x^2}{2} + 21x$ $= -\frac{x}{2}(3x - 42)$	$\checkmark h = 10 - x$ $\checkmark y = 16 - x$ $\checkmark$ substitution/ <i>vervang</i> $\checkmark \frac{-3x^2}{2} - 21x$	(4)
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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/vervangings ✓ $P(A \text{ and / en } B) = 0,125$	(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 komplementêr 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	$P(\text{soul}) = \frac{52}{100} = \frac{13}{25} = 0,52$	✓ $\frac{13}{25}$	(1)
	10.2.3	$P(\text{jazz or soul}) = \frac{48}{100} + \frac{52}{100} - \frac{10}{100} = \frac{9}{10}$	✓ $\frac{9}{10}$	(1)
10.3	10.3.1	$7 \times 8 \times 8 \times 8$ $= 3\,584 \text{ ways/maniere}$	✓ $7 \times 8 \times 8 \times 8$ ✓ answer/antwoord	(2)
	10.3.2	$7 \times 7 \times 6 \times 5$ $= 1\,470 \text{ ways / maniere}$	✓ $7 \times 7 \times 6 \times 5$ ✓ answer/antwoord	(2)
	10.3.3	$P(\text{code divide by } 5) = \frac{7 \times 8 \times 8 \times 1}{3\,584} = \frac{448}{3\,584}$ $= \frac{1}{8} = 0,125$	✓ $\frac{7 \times 8 \times 8 \times 1}{3\,584}$ ✓ answer/antwoord	(2)
				[17]

TOTAL/ TOTAAL: 150