



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
*NASIONALE
SENIOR SERTIFIKAAT***

GRADE/*GRAAD* 10

MATHEMATICS P1/*WISKUNDE V1*

NOVEMBER 2015

MEMORANDUM

MARKS/*PUNTE*: 100

**This memorandum consists of 9 pages.
*Hierdie memorandum bestaan uit 9 bladsye.***

NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking memorandum.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde aan te neem om 'n probleem op te los.

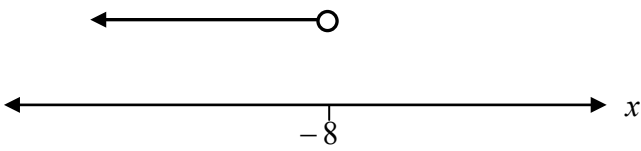
QUESTION/VRAAG 1

1.1.1	$x^4 - 81$ $= (x^2 - 9)(x^2 + 9)$ $= (x - 3)(x + 3)(x^2 + 9)$	$\checkmark (x^2 - 9)(x^2 + 9)$ $\checkmark (x - 3)(x + 3)(x^2 + 9)$ <p style="text-align: right;">(2)</p>
1.1.2	$6x^2y - 10xy + 15x - 25$ $= 2xy(3x - 5) + 5(3x - 5)$ $= (2xy + 5)(3x - 5)$ <p>OR/OF</p> $6x^2y - 10xy + 15x - 25$ $= 3x(2xy + 5) - 5(2xy + 5)$ $= (2xy + 5)(3x - 5)$	$\checkmark 2xy(3x - 5)$ $\checkmark 5(3x - 5)$ $\checkmark (2xy + 5)(3x - 5)$ <p style="text-align: right;">(3)</p> $\checkmark 3x(2xy + 5)$ $\checkmark -5(2xy + 5)$ $\checkmark (2xy + 5)(3x - 5)$ <p style="text-align: right;">(3)</p>
1.2.1	$\frac{3}{a-4} + \frac{2}{a+3} - \frac{21}{a^2 - a - 12}$ $= \frac{3}{a-4} + \frac{2}{a+3} - \frac{21}{(a-4)(a+3)}$ $= \frac{3(a+3) + 2(a-4) - 21}{(a-4)(a+3)}$ $= \frac{3a + 9 + 2a - 8 - 21}{(a-4)(a+3)}$ $= \frac{5a - 20}{(a-4)(a+3)}$ $= \frac{5(a-4)}{(a-4)(a+3)}$ $= \frac{5}{a+3}$	$\checkmark (a-4)(a+3)$ $\checkmark \checkmark \frac{3(a+3) + 2(a-4) - 21}{(a-4)(a+3)}$ $\checkmark \text{simplification, i.e./}$ $\checkmark \text{vereenvoudiging, d.i.}$ $\frac{5a - 20}{(a-4)(a+3)}$ $\checkmark \text{answer/antwoord}$ <p style="text-align: right;">(5)</p>

1.2.2	$\frac{10^{2x+3} \cdot 4^{1-x}}{25^{2+x}}$ $= \frac{(2 \cdot 5)^{2x+3} \cdot (2^2)^{1-x}}{(5^2)^{2+x}}$ $= \frac{2^{2x+3} \cdot 5^{2x+3} \cdot 2^{2-2x}}{5^{4+2x}}$ $= 2^{2x+3+2-2x} \cdot 5^{2x+3-4-2x}$ $= 2^5 \cdot 5^{-1}$ $= \frac{32}{5}$ $= 6\frac{2}{5}$	<p>✓ writing bases in terms of prime factors/ <i>skryf basisse in terme van priemfaktore</i></p> <p>✓ simplification/ <i>vereenvoudiging</i></p> <p>✓ adding and subtracting indices/optel en aftrek van eksponente</p> <p>✓ $2^5 \cdot 5^{-1}$ or/of $\frac{32}{5}$ or/of $6\frac{2}{5}$</p> <p>(4)</p>
1.3.1	$\sqrt{27}$	✓ answer/antwoord (1)
1.3.2	$\sqrt{-27}$	✓ answer/antwoord (1)
[16]		

QUESTION/VRAAG 2

2.1.1	$15x^2 - 14x - 8 = 0$ $(5x + 2)(3x - 4) = 0$ $5x + 2 = 0 \quad \text{or} \quad 3x - 4 = 0$ $x = -\frac{2}{5} \quad \text{or} \quad x = \frac{4}{3}$	<p>✓ standard form/standaardvorm</p> <p>✓ factorisation/faktorisering</p> <p>✓✓ answers/antwoorde</p> <p>(4)</p>
2.1.2	$5^x = \frac{1}{125}$ $5^x = \frac{1}{5^3}$ $5^x = 5^{-3}$ $x = -3$	<p>✓ 5^{-3}</p> <p>✓ answer/antwoord</p> <p>(2)</p>
2.2.1	$3(x + 7) < \frac{x}{2} + 1$ $3x + 21 < \frac{x}{2} + 1$ $6x + 42 < x + 2$ $5x < -40$ $x < -8$	<p>✓ $3x + 21$</p> <p>✓ $6x + 42 < x + 2$</p> <p>✓ answer/antwoord</p> <p>(3)</p>

2.2.2		✓ indicating numbers to the left of -8 and -8 not included/ <i>dui getalle links van -8 aan met -8 nie gesluit</i> (1)
2.3	Let the amount of money Mary had be Rx/Laat die bedrag geld wat Mary gehad het x wees. $\frac{1}{5}x = \frac{1}{3}x - 28$ $3x + 420 = 5x$ $2x = 420$ $x = 210$ Mary had R210/Mary het R210 gehad.	✓ $\frac{1}{3}x - 28$ ✓ $\frac{1}{5}x$ ✓ equation/vergeljking ✓ 210 (4) [14]

QUESTION/VRAAG 3

3.1.1	$-7 ; -12$	✓ -7 ✓ -12 (2)
3.1.2	$T_n = -5n + 13$	✓ $-5n$ ✓ 13 (2)
3.1.3	$T_n = -5n + 13$ $T_{30} = -5(30) + 13$ $= -137$	✓ substitution of/substitusie van $n = 30$ ✓ answer/antwoord (2)
3.1.4	$-5n + 13 = -492$ $-5n = -505$ $n = 101$	✓ $-5n + 13 = -492$ ✓ answer/antwoord (2)
3.2.1	$T_n = 2n - 1$	✓ $2n$ ✓ -1 (2)
3.2.2	$T_n = (2n - 1)^2$ $= 4n^2 - 4n + 1$	✓ $(2n - 1)^2$ (1)
3.2.3	$T_n = (2n - 1) - (2n - 1)^2$ $= 2n - 1 - (4n^2 - 4n + 1)$ $= 2n - 1 - 4n^2 + 4n - 1$ $= -4n^2 + 6n - 2$	✓ $(2n - 1) - (2n - 1)^2$ ✓ $2n - 1 - (4n^2 - 4n + 1)$ ✓ $2n - 1 - 4n^2 + 4n - 1$ ✓ answer/antwoord (4) [15]

QUESTION/VRAAG 4

4.1	$y = 1$	✓ answer/antwoord (1)
4.2		f: ✓ shape of f /vorm van f ✓ x -intercepts of f / x -afsnitte van f ✓ y -intercept (TP) of f / y -afsnit (DP) van f g: ✓ shape of g /vorm van g ✓ asymptote of g / asimptoot van g ✓ y -intercept of g / y -afsnit van g (6)
4.3	Range of f /Waardeversameling van f : $(-\infty ; 2]$ OR/OF Range of f /Waardeversameling van f : $y \leq 2$	✓ $(-\infty ; 2]$ (1) ✓ $y \leq 2$ (1)
4.4	Maximum of $3^{f(x)}$ will be obtained when $f(x)$ is at maximum. Max of $f(x)$ is 2 Max of h will be $3^2 = 9$ <i>Maksimum van $3^{f(x)}$ sal verkry word wanneer $f(x)$ by maksimum is. Maks van $f(x)$ is 2 Maks van h sal $3^2 = 9$ wees.</i>	✓ Max of $f(x)$ is 2/ Maks van $f(x)$ is 2 ✓ Max of $h = 9$ / Maks van $h = 9$ (2)
4.5	f would have been reflected in the x -axis <i>f sou in die x-as gereflekteer gewees het</i>	✓ reflected/gereflekteer ✓ in the x -axis/ in die x -as (2)

[12]

QUESTION/VRAAG 5

<p>5.1</p>	<p>$a = \text{gradient of } g$ $= \frac{-4 - 4}{-1 - 3}$ $= 2$ $4 = 2(3) + q$ $q = -2$ $g(x) = 2x - 2$</p> <p>OR/OF</p> <p>$a = \text{gradient of } g$ $= \frac{4 - (-4)}{3 - (-1)}$ $= 2$ $-4 = 2(-1) + q$ $q = -2$ $g(x) = 2x - 2$</p> <p>OR/OF</p> <p>$g(x) = ax + q$ $4 = 3a + q \dots\dots\dots 1$ $-4 = -a + q \dots\dots\dots 2$ $1 - 2:$ $8 = 4a$ $a = 2$ Substitute in 1/<i>Substitusie in 1:</i> $4 = 3(2) + q$ $q = -2$ $g(x) = 2x - 2$</p>	<p>$\checkmark a = \frac{-4 - 2}{-1 - 2}$</p> <p>$\checkmark$ substituting/<i>substitusie</i> B(3 ; 4) (2)</p> <p>$\checkmark a = \frac{4 - (-4)}{3 - (-1)}$</p> <p>$\checkmark$ substituting/<i>substitusie</i> A(-1 ; -4) (2)</p> <p>\checkmark substituting both points/ <i>substitusie van beide punte</i></p> <p>\checkmark solving simultaneously/ <i>los gelyktydig op</i> (2)</p>
<p>5.2</p>	<p>$\frac{1}{x} - 1 = 2x - 2$ $\frac{1}{x} = 2x - 1$ $1 = 2x^2 - x$ $2x^2 - x - 1 = 0$ $(2x + 1)(x - 1) = 0$ $x = -\frac{1}{2} \qquad \text{or} \qquad x = 1$</p>	<p>\checkmark equating/<i>gelykstelling</i></p> <p>\checkmark standard form/ <i>standaardvorm</i></p> <p>\checkmark factors/<i>faktore</i> \checkmark x-values/<i>-waardes</i> (4)</p>

<p>5.3</p>	<p>$-\frac{1}{2} \leq x < 0$ or/of $x \geq 1$</p> <p>OR/OF</p> <p>$\left[-\frac{1}{2}; 0\right) \cup [1; \infty)$</p>	<p>✓ $x \geq -\frac{1}{2}$</p> <p>✓ $x < 0$</p> <p>✓ $x \geq 1$</p> <p>✓ $[-0,5$</p> <p>✓ $0)$</p> <p>✓ $[1; \infty)$</p> <p>(3)</p>
<p>5.4</p>	<p>$f(3) = \frac{1}{3} - 1$</p> <p>$= -\frac{2}{3}$</p> <p>Length of BE = $4 - f(3)$</p> <p>$= 4 - \left(-\frac{2}{3}\right)$</p> <p>$= 4 + \frac{2}{3}$</p> <p>$= 4\frac{2}{3}$</p> <p>OR/OF</p> <p>BE = $2x - 2 - \frac{1}{x} + 1$</p> <p>$= \frac{2x^2 - x - 1}{x}$</p> <p>$(x = 3)$ BE = $\frac{2(3)^2 - (3) - 1}{3}$</p> <p>$= \frac{18 - 4}{3}$</p> <p>$= 4\frac{2}{3}$</p>	<p>✓ $\frac{1}{3} - 1$ or $-\frac{2}{3}$</p> <p>✓ $4 - f(3)$</p> <p>✓ answer/antwoord</p> <p>✓ $2x - 2 - \frac{1}{x} + 1$</p> <p>✓ $\frac{2(3)^2 - (3) - 1}{3}$</p> <p>✓ answer/antwoord</p> <p>(3)</p>
<p>5.5</p>	<p>$h(x) = f(x) + 3$</p> <p>$h(x) = \frac{1}{x} + 2$</p>	<p>✓ answer/antwoord</p> <p>(1)</p> <p>[13]</p>

QUESTION/VRAAG 6

6.1	$d - 5 + d - 1 = 0$ $2d = 6$ $d = 3$	$\checkmark d - 5 + d - 1 = 0$ $\checkmark d = 3$ (2)
6.2	$y = a(x - 2)(x + 2)$ $-9 = a(1 - 2)(1 + 2)$ $-9 = a(-1)(3)$ $-3a = -9$ $a = 3$ $f(x) = 3(x^2 - 4)$ $= 3x^2 - 12$ $c = -12$	$\checkmark y = a(x - 2)(x + 2)$ \checkmark subs (1 ; -9) $\checkmark a = 3$ $\checkmark c = -12$ (4) [6]

QUESTION/VRAAG 7

7.1	$\frac{\text{R}5000}{9,518569 \text{ rands per dollar}} = \$525,29$ <p>OR/OF</p> $\text{R}5000 \times 0,105058 \text{ dollars per rand} = \$525,29$	\checkmark selects/kies 9,518569 \checkmark answer/antwoord (2) \checkmark selects/kies 0,105058 \checkmark answer/antwoord (2)
7.2.1	$A = P(1 + i)^n$ $= 5000(1 + 0,061)^3$ $= \text{R}5\,971,95$	\checkmark formula/formule $\checkmark 5000(1 + 0,061)^3$ $\checkmark \text{R}5\,971,95$ (3)
7.2.2	<p>Let the amount that Zach invests each year be x/Laat die bedrag wat Zach elke jaar belê, x wees.</p> $x(1 + 0,09)^2 + x(1 + 0,09)^1 = 5980$ $x[1,09^2 + 1,09] = 5980$ $x = \frac{5980}{1,09^2 + 1,09}$ $= \text{R}2\,624,99$ <p>OR/OF</p> <p>Let the amount that Zach invests each year be x/Laat die bedrag wat Zach elke jaar belê, x wees.</p> $[x(1 + 0,09)^1 + x](1 + 0,09)^1 = 5980$ $x(2,09)(1,09) = 5980$ $x = \frac{5980}{(2,09)(1,09)}$ $= \text{R}2\,624,99$	$\checkmark x(1 + 0,09)^2$ $\checkmark x(1 + 0,09)^1$ $\checkmark x$ as common factor/ as gemeenskaplike faktor \checkmark answer/antwoord (4) $\checkmark x(1 + 0,09)^1$ $\checkmark [x(1 + 0,09)^1 + x]$ $\checkmark x$ as common factor/ as gemeenskaplike faktor \checkmark answer/antwoord (4) [9]

QUESTION/VRAAG 8

<p>8.1.1</p>	<p style="text-align: center;">Sample space/Steekproefruimte (64)</p> <p style="text-align: center;">Soccer/sokker (24) Rugby (28)</p> <p style="text-align: center;">14 10 18</p> <p style="text-align: right;">22</p>	<p>✓ diagram shape/ diagramvorm ✓ 14 in correct position/ in korrekte posisie ✓ 10 in correct position/ in korrekte posisie ✓ 18 in correct position/ in korrekte posisie ✓ 22 in correct position/ in korrekte posisie</p> <p style="text-align: right;">(5)</p>
<p>8.1.2 (a)</p>	$P(\text{Soccer and Rugby}) = \frac{10}{64} = \frac{5}{32} = 0,15625 = 15,63\%$	<p>✓ answer (in any form)/ antwoord (in enige vorm)</p> <p style="text-align: right;">(1)</p>
<p>8.1.2 (b)</p>	$P(\text{Soccer or Rugby}) = \frac{14 + 10 + 18}{64} = \frac{42}{64} = \frac{21}{32} = 0,65625 = 65,63\%$ <p>OR / OF</p> $P(\text{Soccer or Rugby}) = 1 - \frac{22}{64} = \frac{21}{32}$	<p>✓ answer (in any form)/ antwoord (in enige vorm)</p> <p style="text-align: right;">(1)</p>
<p>8.1.3</p>	<p>No/Nee. Some boys play both soccer and rugby/Party seuns speel sokker en rugby. OR/OF No/Nee $P(S \text{ and } R) \neq 0 / P(S \text{ en } R) \neq 0$</p>	<p>✓ No/Nee ✓ Reason/Rede</p> <p style="text-align: right;">(2)</p> <p>✓ No/Nee ✓ Reason/Rede</p> <p style="text-align: right;">(2)</p>
<p>8.2</p>	$P(\text{more than 2 passengers per car}) / P(\text{meer as 2 passasiers per kar})$ $= \frac{5 + 1}{7 + 11 + 6 + 5 + 1}$ $= \frac{6}{30}$ $= \frac{1}{5} = 0,2 = 20\%$	<p>✓ numerator/teller 6 ✓ denominator/ noemer 30 ✓ answer/antwoord (accept/aanvaar $\frac{6}{30}$ or $\frac{1}{5}$ or/of 0,2 or/of 20%)</p> <p style="text-align: right;">(3)</p>
<p>8.3</p>	$P(\text{not getting a six}) / P(\text{nie 'n ses kry nie})$ $= 1 - \left(\frac{10}{36} + \frac{1}{36} \right)$ $= \frac{25}{36}$	<p>✓ $\left(\frac{10}{36} + \frac{1}{36} \right)$ ✓ $1 - \left(\frac{10}{36} + \frac{1}{36} \right)$ ✓ $\frac{25}{36}$</p> <p style="text-align: right;">(3)</p>

[15]

TOTAL/TOTAAL: 100