



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENGSE DEPARTEMENT VAN ONDERWYS
PROVINSIALE EKSAMEN
JUNIE 2017
GRAAD 11

WISKUNDE
VRAESTEL P 1

MEMORANDUM

11 bladsye

GAUTENGSE DEPARTEMENT VAN ONDERWYS
PROVINSIALE EKSAMEN**WISKUNDE**
(Vraestel 1)**MEMORANDUM**

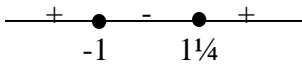
INLIGTING

A – Akkuraatheid

CA – Deurlopende Akkuraatheid

NOTA:

- Indien 'n kandidaat 'n vraag TWEE MAAL beantwoord het, merk slegs die eerste poging.
- Indien 'n kandidaat 'n antwoord DOODGETREK het, maar dit nie oorgedoen het nie, merk die doodgetrekte antwoord.
- Volgehoue akkuraatheid word in ALLE aspekte van die memorandum toegepas. Hou op nasien by die tweede berekeningsfout.
- Om antwoorde/waardes om 'n probleem op te los, te veronderstel, word NIE toegelaat NIE.

	VRAAG 1	PUNTE: 19
1.1.1	$x^2 - 2x = 15$ $x^2 - 2x - 15 = 0$ $(x - 5)(x + 3) = 0$ $x = 5 \text{ of } x = -3$	<ul style="list-style-type: none"> ✓ std. vorm ✓ korrekte faktore ✓ beide oplossings <p style="text-align: right;">(3)</p>
1.1.2	$4x^2 - x - 5 < 0$ $(4x - 5)(x + 1) < 0$  $-1 < x < 1\frac{1}{4}$	<ul style="list-style-type: none"> ✓ faktore ✓ kritiese waardes ✓ korrekte ongelykheid <p style="text-align: right;">(3)</p>
1.1.3	$\sqrt{2x - 1} + 2 = x$ $(\sqrt{2x - 1})^2 = (x - 2)^2$ $2x - 1 = x^2 - 4x + 4$ $0 = x^2 - 6x + 5$ $0 = (x - 5)(x - 1)$ $x = 5 \text{ of } x = 1$ <p>Toets: $x = 5$ alleen</p>	<ul style="list-style-type: none"> ✓ kwadreer albei kante ✓ std. vorm ✓ faktore ✓ altwee oplossings ✓ aanvaar $x = 5$ <p style="text-align: right;">(5)</p>
1.1.4	$2x^{\frac{2}{3}} - 8 = 0$ $2x^{\frac{2}{3}} = 8$ $x^{\frac{2}{3}} = 4$ $(x^{\frac{2}{3}})^{\frac{3}{2}} = \pm (4)^{\frac{3}{2}}$ $x = \pm 2^3 \text{ OF}$ $x = \pm 8$ <p>OF</p> $x^{\frac{2}{3}} = 4$ $\left(\sqrt[3]{x^2}\right)^3 = (4)^3$ $x^2 = 64$ $x = \pm 8$	<ul style="list-style-type: none"> ✓ $x^{\frac{2}{3}} = 4$ ✓ verhef altwee kante tot mag $\frac{3}{2}$ ✓ $x = \pm 2^3$ OF $x = \pm 8$ OF ✓ $x^{\frac{2}{3}} = 4$ ✓ verhef altwee kante tot mag 3 ✓ $x = \pm 2^3$ OF $x = \pm 8$ <p style="text-align: right;">(3)</p>

1.2	$a + b + c = 0$ $b = -a - c$ $ax^2 + bx + c = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-a - c) \pm \sqrt{(-a - c)^2 - 4ac}}{2a}$ $= \frac{a + c \pm \sqrt{a^2 + 2ac + c^2 - 4ac}}{2a}$ $= \frac{a + c \pm \sqrt{a^2 - 2ac + c^2}}{2a}$ $= \frac{a + c \pm \sqrt{(a - c)^2}}{2a}$ $= \frac{a + c \pm (a - c)}{2a}$ $\therefore x = 1 \text{ of } x = \frac{c}{a}$	<p>✓ $b = -a - c$</p> <p>✓ vervang in korrekte formule</p> <p>✓ vereenvoudig na $\sqrt{a^2 - 2ac + c^2}$</p> <p>✓ $(a - c)^2$</p> <p>✓ $x = 1$</p>
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(5)

	VRAAG 2	PUNTE: 15
2.1	<p>Vanaf (1)</p> $3y + x = 2 \dots\dots\dots(1)$ $y^2 + x = xy + y\dots\dots\dots(2)$ $x = 2 - 3y$ <p>Verv. $x = 2 - 3y$ in (2)</p> $y^2 + (2 - 3y) = y(2 - 3y) + y$ $y^2 + 2 - 3y = 2y - 3y^2 + y$ $4y^2 - 6y + 2 = 0$ $2y^2 - 3y + 1 = 0$ $(2y - 1)(y - 1) = 0$ $y = \frac{1}{2} \text{ of } y = 1$ $\therefore x = \frac{1}{2} \text{ of } x = -1$ <p>[÷ 2]</p>	<p>✓ $x = 2 - 3y$</p> <p>✓ verv. $x = 2 - 3y$ in..... (2)</p> <p>✓ std. vorm</p> <p>✓ faktoriseer</p> <p>✓ beide y waardes</p> <p>✓ beide x waardes</p>

(6)

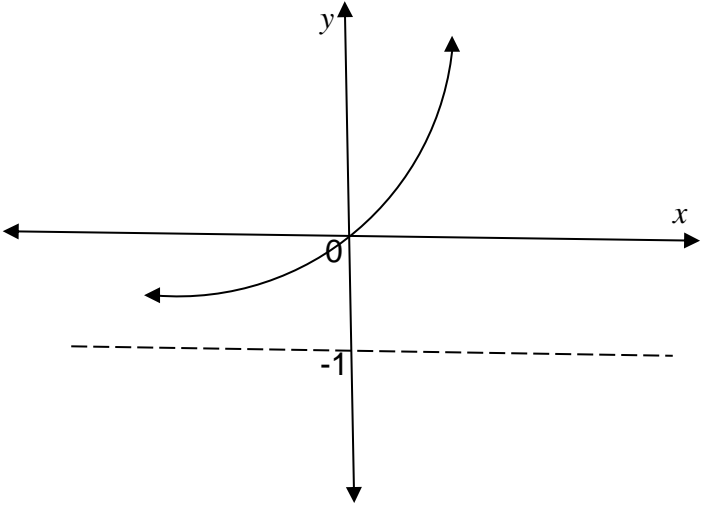
2.2	$\begin{aligned} \text{L.K: } & \sqrt{b\sqrt{a}-b} \cdot \sqrt{b\sqrt{a}+b} \\ & = \sqrt{(b\sqrt{a}-b)(b\sqrt{a}+b)} \\ & = \sqrt{b^2a-b^2} \\ & = \sqrt{b^2(a-1)} \\ & = b\sqrt{a-1} = \text{R.H.S} \end{aligned}$	$\begin{aligned} & \checkmark (b\sqrt{a}-b)(b\sqrt{a}+b) \\ & \checkmark \text{ vereenvoudig } \sqrt{b^2a-b^2} \\ & \checkmark \text{ faktoriseer} \\ & \checkmark b \end{aligned}$ <p style="text-align: right;">(4)</p>
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2.3	$\begin{aligned} 3^a & = 21^b \\ (3^a)^c & = (21^b)^c \\ 3^{ac} & = (3^b \times 7^b)^c \\ 3^{ac} & = 3^{bc} \times 7^{bc} \\ 3^{ac} & = 3^{bc+ab} \\ ac & = bc + ab \\ ac & = b(c+a) \\ \therefore b & = \frac{ac}{a+c} \end{aligned}$	$\begin{aligned} & \checkmark \text{ verhef tot } c \text{ aan beide kante} \\ & \checkmark (3^b \times 7^b)^c \\ & \checkmark \text{ aflei dat } 7^c = 3^a \\ & \checkmark \text{ gelykstel van eksponente} \\ & \checkmark \text{ faktoriseer} \end{aligned}$ <p style="text-align: right;">(5)</p>
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VRAAG 3		PUNTE: 18
3.1.1	13	$\checkmark \text{ antwoord}$ <p style="text-align: right;">(1)</p>
3.1.2	$\begin{aligned} T_n & = an + b \\ -3 & = 4(1) + b \\ -7 & = b \\ T_n & = 4n - 7 \end{aligned}$ <p>ENIGE ander aanvaarbare metode</p>	$\begin{aligned} & \checkmark b = -7 \\ & \checkmark \text{ antwoord} \end{aligned}$ <p style="text-align: right;">(2)</p>
3.1.3	$\begin{aligned} 394 & = 4n - 7 \\ 401 & = 4n \\ 100,25 & = n \end{aligned}$ <p>Aangesien $n \notin \mathbb{N}$, is 394 NIE 'n term NIE</p>	$\begin{aligned} & \checkmark \text{ vergelyking} \\ & \checkmark 100,25 = n \\ & \checkmark \text{ enige aanvaarbare} \\ & \quad \text{verduideliking} \end{aligned}$ <p style="text-align: right;">(3)</p>

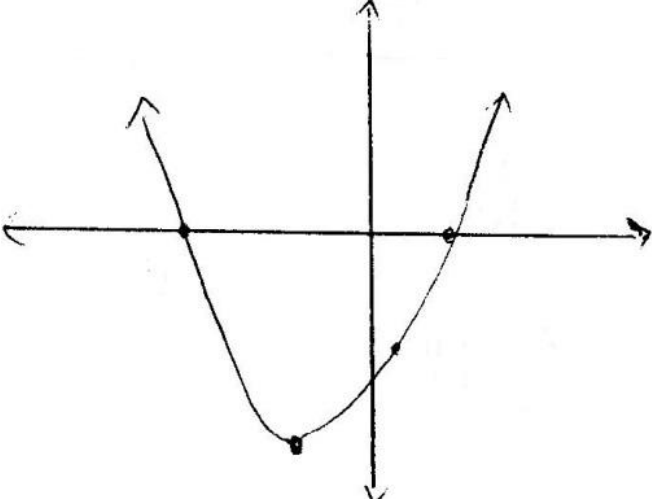
3.2.1	<p>OF</p> $T_n = n^2 + 2n + c$ $0 = (1)^2 + 2(1) + c$ $0 = 3 + c$ $-3 = c$ $T_1 = a + b + c$ $0 = 1 + 2 + c$ $0 = 3 + c$ $-3 = c$	<p>✓ korrek vervang ✓ vereenvoudig</p> <p>OF</p> <p>✓ korr. vervang. ✓ vereenvoudig</p> <p style="text-align: right;">(2)</p>
3.2.2	$T_n = n^2 + 2n + c$ $T_{10} = (10)^2 + 2(10) - 3$ $= 117$	<p>✓ korrek vervang ✓ antwoord</p> <p style="text-align: right;">(2)</p>
3.2.3	$n^2 + 2n - 3 > 360$ $n^2 + 2n - 363 > 0$ $n = \frac{(-2) \pm \sqrt{2^2 - 4(1)(-363)}}{2(1)}$ $n = -20,08 \text{ of } n = 18,08$ $\therefore n = 19$ $T_{19} > 360$	<p>✓ $n^2 + 2n - 363 > 0$</p> <p>✓ korrek vervang in korrekte. formule</p> <p>✓ beide kritiese waardes</p> <p>✓ $n = 19$</p> <p style="text-align: right;">(4)</p>
3.3.1	$a = 10$	<p>✓ antwoord</p> <p style="text-align: right;">(1)</p>
3.3.2	$b = 99 + 98 + 97 + 96 \dots\dots + 50 + \dots\dots + 3 + 2 + 1$ $(99 + 1) = 100$ $(98 + 2) = 100$ \vdots $\therefore b = (100) \times 49 + 50$ $b = 4950$	<p>✓ ry</p> <p>✓ $(100) \times 49$ ✓ antwoord</p> <p style="text-align: right;">(3)</p>

	VRAAG 4	PUNTE: 6
4.1	$x - 2 \geq 0$ $x \geq 2$	✓ $x - 2 \geq 0$ ✓ antwoord (2)
4.2	2	✓ antwoord (1)
4.3	$k = 2 + \frac{\sqrt{3-2}}{4}$ $= 2\frac{1}{4}$ $g(k) = \left(2\frac{1}{4}\right)^2 - 1$ $= 4\frac{1}{16} \text{ OF } \frac{65}{16} \text{ OF } 4,06$	✓ $k = 2\frac{1}{4}$ ✓ vervanging ✓ antwoord (3)
	VRAAG 5	PUNTE: 12
5.1	vir x - afsnit, maak $y = 0$ $3^x - 1 = 0$ $3^x = 1$ $3^x = 3^0$ $x = 0$ vir y - afsnit, maak $x = 0$ $y = 3^0 - 1$ $y = 0$	✓ $1 = 3^0$ ✓ $x = 0$ ✓ $y = 0$ (3)

5.2.		<ul style="list-style-type: none"> ✓ vorm ✓ gaan deur die oorsprong ✓ asimptoot by $y = -1$ <p style="text-align: right;">(3)</p>
5.3	$(-1; \infty)$ OF $y > -1$	<ul style="list-style-type: none"> ✓ antwoord <p style="text-align: right;">(1)</p>
5.4.1	$x = -2$	<ul style="list-style-type: none"> ✓ antwoord <p style="text-align: right;">(1)</p>
5.4.2	$x > -1$	<ul style="list-style-type: none"> ✓ antwoord <p style="text-align: right;">(1)</p>
5.5	$3h(x) = 726$ $h(x) = 242$ $3^x - 1 = 242$ $3^x = 243$ $3^x = 3^5$ $x = 5$	<ul style="list-style-type: none"> ✓ 242 ✓ 3^5 ✓ antwoord <p style="text-align: right;">(3)</p>

	VRAAG 6	PUNTE: 10
6.1	$x = 1$ $y = -2$	✓ $x = 1$ ✓ $y = -2$ (2)
6.2	Vir x -afsnit, maak $y = 0$ $0 = \frac{3}{x-1} - 2$ $2 = \frac{3}{x-1}$ $x = 2\frac{1}{2}$ Vir y -afsnit, maak $x = 0$ $y = \frac{3}{0-1} - 2$ $y = -5$	✓ $y = 0$ ✓ $x = 2\frac{1}{2}$ ✓ $y = -5$ (3)
6.3		✓ vorm ✓ x en y -afsnit ✓ asimptote (3)
6.4	Refleksie om die y -as.	✓ refleksie ✓ y -as (2)

	VRAAG 7	PUNTE: 20
7.1.1	$x = \frac{-b}{2a}$ $= \frac{-(8)}{2(2)}$ $= -2$ <p>D(- 2 ; - 5)</p>	<p>✓ korrekte vervanging in korrekte formule</p> <p>✓ x-koördinaat = - 2</p> <p>✓ y-koördinaat. = - 5 (as nie in koördinaat vorm slegs) $\frac{2}{3}$</p> <p style="text-align: right;">(3)</p>
7.1.2	$x \geq 0 \text{ of } x \leq -4$	<p>✓ $x \geq 0$</p> <p>✓ $x \leq -4$</p> <p>(verkeerde notasie slegs) $\frac{1}{2}$</p> <p style="text-align: right;">(2)</p>
7.1.3	$\text{LM} = k(x) - p(x)$ $= 2x^2 + 8x + 3 - (2x - 4)$ $= 2x^2 + 6x + 7$ $\text{Min}_{\text{LM}} = \frac{4ac - b^2}{4a}$ $= \frac{4(2)(7) - 6^2}{4(2)}$ $= 2\frac{1}{2}$ <p>OF</p> $\text{LM} = k(x) - p(x)$ $= 2x^2 + 8x + 3 - (2x - 4)$ $= 2x^2 + 6x + 7$ $x = \frac{-b}{2a}$ $= \frac{-(6)}{2(2)}$ $= -\frac{3}{2}$ $\text{Min}_{\text{LM}} = 2\left(-\frac{3}{2}\right)^2 + 6\left(-\frac{3}{2}\right) + 7$ $= 2\frac{1}{2}$	<p>✓ vereenvoudig</p> <p>✓ formule</p> <p>✓ korrekte vervanging in korrekte formule</p> <p>✓ antwoord</p> <p>OF</p> <p>✓ vereenvoudig</p> <p>✓ korrekte vervanging in korrekte formule</p> <p>✓ vervang x in vergelyking</p> <p>✓ antwoord</p> <p style="text-align: right;">(4)</p>

7.1.4	$\text{Gem. grad} = \frac{k(-2) - k(3)}{-2 - 3}$ $= \frac{-5 - 45}{-2 - 3}$ $= 10$	<ul style="list-style-type: none"> ✓ -5 ✓ -45 ✓ antwoord <p style="text-align: right;">(3)</p>
7.1.5	$2x^2 + 8x + 3 = 2x + t$ $2x^2 + 6x + 3 - t = 0$ $\Delta = b^2 - 4ac$ $= (6)^2 - 4(2)(3 - t)$ $= 39 - 24 + 8t$ $= 12 + 8t$ <p>Vir = wortels, $\Delta = 0$</p> $12 + 8t = 0$ $8t = -12$ $t = -1\frac{1}{2} \text{ of } -\frac{3}{2} \text{ of } -1,5$	<ul style="list-style-type: none"> ✓ std. vorm ✓ kor. vervanging in formule ✓ waarde van Δ ✓ $\Delta = 0$ ✓ antwoord <p style="text-align: right;">(5)</p>
7.2		<ul style="list-style-type: none"> ✓ vorm ✓ x-afsnitte ✓ draaipunt in 3rd kwadrant <p style="text-align: right;">(3)</p>