basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 10

MATHEMATICS P1/*WISKUNDE V1*

NOVEMBER 2016

MEMORANDUM

MARKS/*PUNTE*: 100

This memorandum consists of 10 pages.
Hierdie memorandum bestaan uit 10 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 te veronderstel om 'n probleem op te los.*

QUESTION 1/*VRAAG* 1		
1.1.1	$x^2 - x$ $= x(x-1)$	✓ answer/*antwoord* (1)
1.1.2	$3x^2 + 3px - 2mx - 2mp$ $= 3x(x+p) - 2m(x+p)$ $= (3x-2m)(x+p)$ **OR/*OF*** $3x^2 - 2mx + 3px - 2mp$ $= x(3x-2m) + p(3x-2m)$ $= (3x-2m)(x+p)$	✓ com. fact/ *gemeen fak.* ✓ com.brack./ *gem. haak* ✓ answer/*antwoord* (3) ✓ com. fact/ *gem fak* ✓ com.brack/*gem. hak* ✓ answer/*antwoord* (3)
1.1.3	$2p^2 - 2p - 12$ $= 2(p^2 - p - 6)$ $= 2(p-3)(p+2)$ **OR/*OF*** $2p^2 - 2p - 12$ $= (2p-6)(p+2)$ $= 2(p-3)(p+2)$	✓ com fact/ *gem fak* ✓ trinomial/*drie* ✓ answer/*antwoord* (3) ✓ fact/*fak* ✓ com fact/ *gem fak* ✓ answer/*antwoord* (3)

1.2.1	$\frac{2^{a+1}-2^{a-1}}{2^a}$ $=\frac{2^a(2-2^{-1})}{2^a}$ $=2-\frac{1}{2}$ $=\frac{3}{2}$	✓ com fact/ *gem fak* ✓ $2-2^{-1}$ ✓ answer/*antwoord* (3)
1.2.2	$\frac{x^2-x+1}{x^3+1}\div\frac{2x}{2x+2}$ $=\frac{x^2-x+1}{(x+1)(x^2-x+1)}\times\frac{2(x+1)}{2x}$ $=\frac{1}{x}$	✓ fact.of cube/*fak van vierkant* ✓ tip and times/*inv. en maal* ✓ fact./*fak* ✓answer/*antwoord* (4) **[14]**

QUESTION 2/*VRAAG* 2		
2.1.1	$x(x-1)=20$ $x^2-x-20=0$ $(x-5)(x+4)=0$ $x=5$ or/of $x=-4$	✓simpl/*simpl* ✓stand. form/*stand. vorm* ✓fact/*fak* ✓answer/*antwoord* (4)
2.1.2	$\frac{3x-2}{2}=(x+1)$ $3x-2=2x+2$ $x=4$ **OR/*OF*** $\frac{3x-2}{2}-(x+1)=0$ $\frac{3x-2-2(x+1)}{2}=0$ $\frac{3x-2-2x-2}{2}=0$ $\frac{x-4}{2}=0$ $x=4$	✓ multipl./*maal* ✓ simpl/*simp*. ✓ answer/*ant*woord (3) ✓ multipl./*maal* ✓simpl/*simpl*. ✓answer/*antwoord* (3)

2.2.1	$-4 \le -\frac{1}{2}m < 5$ $-8 \le -m < 10$ $8 \ge m > -10$ $-10 < m \le 8$ **OR/*OF*** $-4 \le -\frac{1}{2}m$ and / *en* $-\frac{1}{2}m < 5$ $-8 \le -m$ and /en $-m < 10$ $-10 < m \le 8$	✓ multipl/*maal* by 2 ✓ m – values/*waardes* ✓ corr.notat/*korr. not*. (3) ✓ multipl/*maal* by 2 ✓ m – values/*waardes* ✓ corr notat./*korr. not* (3)
2.2.2	$(-10\ ;\ 8]$	✓ ans/*ant* (1)
2.3.1	Given/*Gegee* $4x^2 - y^2 = 171$ $2x - y = 9$ $(2x - y)(2x + y) = 171$ $9(2x + y) = 171$ $2x + y = 19$	✓ fact/*fak* ✓ ans/*ant* (2)
2.3.2	$2x - y = 9$ $2x + y = 19$ $4x = 28$ $x = 7$ $y = 5$ **OR/*OF*** $2x - y = 9$ $y = 2x - 9$ $2x + y = 19$ $2x - (2x - 9) = 19$ $4x = 28$ $x = 7$ $y = 5$	✓ method/*methode* ✓ x-value/*waarde* ✓ y – value/*waarde* (3) ✓ method/*methode* ✓ x-value/*waarde* ✓ y – value/*waarde* (3) **[16]**

QUESTION 3/*VRAAG* 3		
3.1	9	✓ ans/*ant* (1)
3.2	25	✓ ans/*ant* (1)
3.3	$D_n = 2n-1$	✓✓ans/*ant* (2)
3.4	$L_n = (n-1)^2$	✓✓ans/*ant* (2)
3.5	$L_n = (n-1)^2$ $(n-1)^2 = 64$ $n^2 - 2n + 1 = 64$ $n^2 - 2n - 63 = 0$ $(n-9)(n+7) = 0$ $n = 9$ or/ of $n = -7$ n/a	✓equating/*vergelyk* ✓factors/*faktore* ✓ ans/*ant* (3)
3.6	Number of dark tiles/*Getal donker teëls* = 1 + 3 + 5 + ... + 199 = 10 000 Total area covered/*Total oppervlakte gedek* $= 10\,000(0{,}3 \times 0{,}6)$ $= 1800\ m^2$	✓✓ 10 000 dark tiles/*donker teëls* ✓ ans/*ant* (3) **[12]**

QUESTION 4/*VRAAG* 4		
4.1.1	The cash deposit/*Kontantdeposito* $= 0{,}15 \times R15550$ $= \text{R } 2332{,}50$ The value of loan/*Waarde van lening* $= R15550 - R2332{,}50$ $= R13217{,}50$	✓deposit/*deposito* ✓ans/*ant* (2)
4.1.2	$A = P(1 + i.n)$ $= 13217{,}50\left(1 + 0{,}1625 \times \frac{54}{12}\right)$ $= \text{R}\,22\,882{,}80$	✓ $A = P(1 + i.n)$ ✓ correct sub into correct formula/*vervang in korrek formule.* ✓ans/*ant* (3)
4.1.3	Annual Insurance premium/*Per jaar versekeringspremie* $= 0{,}015 \times 15\,550$ $= \text{R } 233{,}25$ per annum/per jaar Monthly payments/ Maandelikse paaiement $= \frac{22882{,}80}{54} + \frac{233{,}25}{12}$ $= \text{R } 443{,}19$	✓ instalment per Month/*paaiement per maand* ✓ insurance/*versekering* ✓ ans/*ant* (3)
4.2.1	\$1 = R 13,45 \$*x* = R 4 800 $\$x = \frac{4800}{13{,}45}$ $= \$\,356{,}88$	✓ $\frac{4800}{13{,}45}$ ✓ answer (2)
4.2.2	\$1 = R 13,45 \$85 = R 1143,25 1£ = 21,41 £*x* = R1143,25 $x£ = \frac{1143{,}25}{21{,}41}$ $= £\,53{,}40$	✓ 1 143.25 ✓ 1£ = 21,41 ✓ ans/*ant* (3)

4.3	$A = P(1+i)^n$ $2P = P(1+i)^5$ $2 = (1+i)^5$ $\sqrt[5]{2} = 1+i$ $i = \sqrt[5]{2} - 1$ $i = 0{,}148698 \times 100$ $r = 14{,}87\%$ p.a/per jaar	✓ $A = P(1+i)^n$ ✓ $2P = P(1+i)^5$ ✓ $r = 14{,}87\%$ p.a */pj* (3) **[16]**

QUESTION 5/ *VRAAG* 5		
5.1	C(0 ; –4)	✓ ans/*ant* (1)
5.2	D(0 ; 2)	✓ ans/*ant* (1)
5.3	CD = 2 – (–4) CD = 6 units/*eenhede*	✓ ans/*ant* (1)
5.4	$x^2 - 4 = 0$ $(x-2)(x+2) = 0$ $x = 2 \quad x = -2$ B(–2 ; 0)	✓ $y = 0$ ✓ factors/*faktore* ✓ ans/*ant* (3)
5.5	$x^2 - 4 = -x + 2$ $x^2 + x - 6 = 0$ $(x-2)(x+3) = 0$ $x = 2 \quad x = -3$ E(–3 ; 5)	✓ equating/*vergelyk* ✓ factors/*faktore* ✓ *x*-answer/*antwoord* ✓ *y*-answer/*antwoord* (4)
5.6.1	$-3 < x < 2$ **OR/*OF*** $(-3\ ;\ 2)$	✓ values/*waardes* ✓ notation/*notasie* (2)
5.6.2	$(-\infty\ ;\ -2] \cup \{2\}$	✓ $(-\infty\ ;\ -2]$ ✓ 2 (2)
5.7	K(–2 ; 4) BK = 4 units/*eenhede* AB = 4 units/*eenhede* AK $= \sqrt{4^2 + 4^2}$ (Pythagoras) = 5,66 units/*eenhede*	✓ BK ✓ AB ✓ method/*methode* ✓ answer/*antwoord* (4)
		[18]

QUESTION 6/*VRAAG* 6		
6.1	$y < 8$	✓ answer/*antwoord* (1)
6.2	$-2^x + 8 = 0$ $2^x = 8$ $2^x = 2^3$ $x = 3$ B(3 ; 0)	✓ equating to 0/*vergelyk met 0* ✓ simpli/*vereenv.* ✓ answer/*antwoord* (3)
6.3	$h(x) = 2^x - 8$	✓✓ answer/*antwoord* (2)
6.4	The graph of g was reflected over the x-axis to form h. This means when $y = 0$, the solution will be the same for both functions. This means that both g and h will have an x-intercept at B. *Grafiek g oor die x-as gereflekteer om h te vorm. As y = 0, sal die oplossing dieselfde wees vir albei funksies. Beide g en h sal n x-afsnit by B hê.*	✓ reflection over x-axis/*reflek oor x-as* ✓ explanation/*verduideliking* (2) **[8]**

QUESTION 7/*VRAAG* 7		
	$h(x) = \frac{a}{x} + 3$ $0 = \frac{a}{2} + 3$ $a = -6$ $h(x) = \frac{-6}{x} + 3$	✓ +3 ✓ subs of (2 ; 0)/*sub van (2 ; 0)* ✓ answer for *a/ antwoord van a* ✓ answer/*antwoord* (4) **[4]**

QUESTION 8/*VRAAG* 8		
8.1.1	$27 - x + x + 32 - x + 7 = 42$ $-x = 42 - 66$ $x = 24$	✓equation/*vergelyking* ✓answer/*antwoord* (2)
8.1.2 (a)	P(does not play hockey or soccer/*speel nie hokkie of sokker)* $= \frac{7}{42}$ $= \frac{1}{6}$	✓answer/*antwoord* (1)
8.1.2 (b)	P(soccer only/*slegs sokker*) $= \frac{8}{42}$ $= \frac{4}{21}$ **OR/*OF*** P(soccer only/*slegs sokker*) $= 1 - \left(\frac{3 + 24 + 7}{42}\right)$ $= \frac{8}{42}$ $= \frac{4}{21}$	✓✓answer/*antwoord* (2) ✓✓answer/*antwoord* (2)
8.2.1	$x + 3$	✓answer/*antwoord* (1)
8.2.2	$P(\text{blue/blou}) = \frac{3}{x + 3}$	✓✓ ans/*antwoord* (2)
8.3.1	P(A and/*en* B) = 0	✓ answer/*answer* (1)
8.3.2	$P(\text{B}) = 1 - P(\text{B}')$ $= 1 - 0,7$ $= 0,3$ $P(\text{A or/of B}) = P(\text{A}) + P(\text{B})$ $= 0,55 + 0,3$ $= 0,85$	✓ $P(\text{B}) = 0.3$ ✓subst./*vervang* ✓ answer/*antwoord* (3) [**12**]

TOTAL/*TOTAAL*: 100