basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 10

MATHEMATICS P1/*WISKUNDE V1*

NOVEMBER 2018

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

Approved
11/11/2018

These marking guidelines consist of 11 pages.
Hierdie nasienriglyne bestaan uit 11 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 guidelines.
- 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 nasienriglyne van toepassing.*
- *Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.*

QUESTION/*VRAAG* 1			
1.1.1	$4x-x^3$ $=x(4-x^2)$ $=x(2-x)(2+x)$	**OR/*OF*** $4x-x^3$ $=-x(x^2-4)$ $=-x(x-2)(x+2)$	✓common factor/*gemeenskaplike faktor* ✓difference of two squares/*verskil van twee kwadrate* (2)
1.1.2	$x^2+15x-54$ $=(x+18)(x-3)$	If correct factors, incorrect signs : 1/2 marks	✓✓factors/*faktore* (2)
1.1.3	$y-xy+x-1$ $=y(1-x)-1(1-x)$ $=(y-1)(1-x)$	**OR/*OF*** $y-xy+x-1$ $=y-1-x(y-1)$ $=(y-1)(1-x)$	✓first common factor or group $(y-1)$ ✓second common factor ✓answer (3)
1.2.1	$(x+2)(x^2-x+3)$ $=x^3-x^2+3x+2x^2-2x+6$ $=x^3+x^2+x+6$	Answer only : 2/2 marks	✓simplification/ *vereenvoudiging* ✓answer/*antwoord* (2)
1.2.2	$\frac{5}{x+3}-\frac{3}{2-x}$ $=\frac{5(2-x)-3(x+3)}{(x+3)(2-x)}$ $=\frac{10-5x-3x-9}{(x+3)(2-x)}$ $=\frac{1-8x}{(x+3)(2-x)}$ **OR**	DEPARTMENT OF BASIC EDUCATION PRIVATE BAG X895, PRETORIA 0001 2018 -11- 12 APPROVED MARKING GUIDELINE PUBLIC EXAMINATION	✓$(x+3)(2-x)$ ✓$5(2-x)-3(x+3)$ ✓answer/*antwoord* (3)

	$\frac{5}{x+3}-\frac{3}{2-x}$ $=\frac{5}{(x+3)}+\frac{3}{(x-2)}$ $=\frac{5(x-2)+3(x+3)}{(x+3)(x-2)}$ $=\frac{5x-10+3x+9}{(x+3)(x-2)}$ $=\frac{8x-1}{(x+3)(x-2)}$	✓ $(x+3)(x-2)$ ✓ $5(x-2)+3(x+3)$ ✓answer/*antwoord* (3)
1.2.3	$\frac{25^{-x}.15^{x+1}}{3^x.5^{-x}}$ $=\frac{5^{-2x}.3^{x+1}.5^{x+1}}{3^x.5^{-x}}$ $=5^{-2x+x+1+x}.3^{x+1-x}$ $=5^1.3^1$ $=15$	✓ 5^{-2x} ✓ $3^{x+1}.5^{x+1}$ ✓answer/*antwoord* (3)
1.3	$(3p+q)^2$ $=9p^2+6pq+q^2$ $=9p^2+q^2+6pq$ $=12+6(-3)$ $=-6$	✓expansion/ *ontwikkeling* ✓subst./*verv.* ✓answer/*antwoord* (3)
		[18]

QUESTION/*VRAAG* 2		
2.1.1	$px+qx=a$ $x(p+q)=a$ $x=\frac{a}{p+q}\ ;\ p\neq -q$ No restriction: 2/2 marks	✓common factor/*gemeenskaplike faktor* ✓answer/*antwoord* (2)
2.1.2	$2x^2-5x+2=0$ $(2x-1)(x-2)=0$ $x=\frac{1}{2}$ or $x=2$	✓factors/*faktore* ✓✓ca answer from factors/*va antwoord van faktors* (3)
2.1.3	$\left(\frac{1}{2}\right)^{3x+1}=32$ $2^{-3x-1}=2^5$ $-3x-1=5$ $3x=-6$ $x=-2$ **OR/*OF*** $\left(\frac{1}{2}\right)^{3x+1}=32$ $\left(\frac{1}{2}\right)^{3x+1}=\left(\frac{1}{2}\right)^{-5}$ $3x+1=-5$ $3x=-6$ $x=-2$	✓ $2^{-3x-1}=2^5$ or $\left(\frac{1}{2}\right)^{3x+1}=\left(\frac{1}{2}\right)^{-5}$ ✓equating exponents/*gelykstelling van eksponente* ✓answer/*antwoord* (3)
2.2.1	$-11\leq 3m-8<4$ $-3\leq 3m<12$ $-1\leq m<4$	✓ $-3\leq 3m<12$ ✓answer/*antwoord* (2)
2.2.2	5 integers/*heelgetalle*	✓answer/*antwoord* (1)
2.3	$5x+4y=21$.....(1) $2x=3-y$.....(2) $y=3-2x$.....(3) sub (3) into (1) $5x+4(3-2x)=21$ $5x-8x=21-12$ $-3x=9$ $x=-3$ $y=3-2(-3)$ $y=9$ **OR/*OF***	✓ $y=3-2x$ ✓subst./*verv.* ✓x value/*x-waarde* ✓y value/*y-waarde* (4) **OR/*OF***

	$5x+4y=21$ .....(1) $2x=3-y$.....(2) $x=\frac{3-y}{2}$.....(3) sub (3) into (1) $5\left(\frac{3-y}{2}\right)+4y=21$ $5(3-y)+8y=42$ $3y=27$ $y=9$ $x=-3$ **OR/*OF*** $5x+4y=21$.....(1)$\times 1$ $2x+y=3$.....(2)$\times 4$ $5x+4y=21$.....(1) $8x+4y=12$.....(3) (3) – (1) : $3x=-9$ $x=-3$ Sub from (2) $y=3-2(-3)$ $y=9$	✓ $x=\frac{3-y}{2}$ ✓subst./*verv.* ✓*y* value/*y-waarde* ✓*x* value/*x-waarde* (4) **OR/*OF*** ✓ $8x+4y=12$ ✓method ✓*x* value/*x-waarde* ✓*y* value/*y-waarde* (4)
		[15]

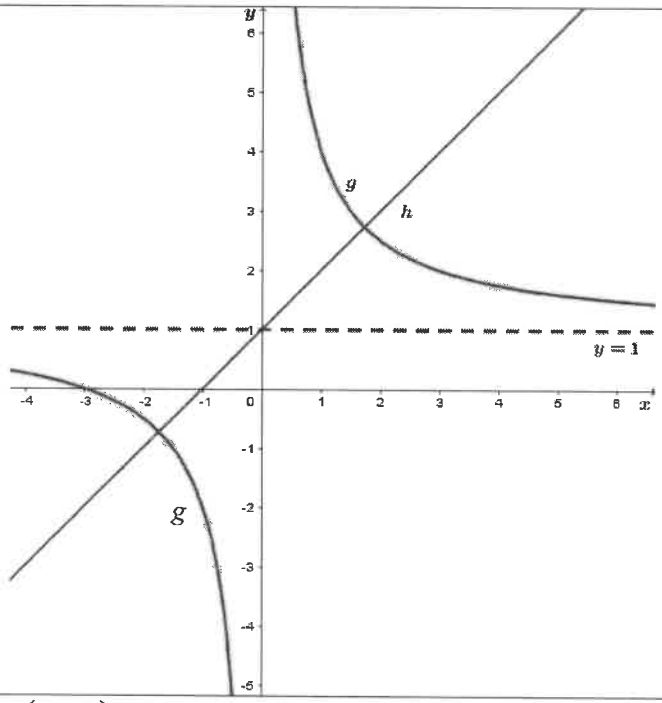
QUESTION/*VRAAG* 3		
3.1	$T_4 = 11$	✓answer/*antwoord* (1)
3.2	$T_n = pn + q$ $= -3n + q$ $14 = -3(3) + q$ $q = 23$ $T_n = -3n + 23$ Answer only: 2/2 marks	✓ common difference $= -3$ ✓answer (2)
3.3	$T_n = -3n + 23$ $-3n + 23 = -103$ $3n = 126$ $n = 42$	✓equating to –103/ *gelykstelling aan –103* ✓answer/*antwoord* (2)
3.4	$T_n < 0$ $-3n + 23 < 0$ $-3n < -23$ $n > \frac{23}{3}$ (7,666...) $\therefore n = 8$ Answer only: 1/3 marks **OR/*OF*** 20 ; 17 ; 14 ; 11 ; 8 ; 5 ; 2 ; –1 $n = 8$ terms	✓$T_n < 0$ ✓simplification/ *vereenvoudiging* ✓correct conclusion, i.e $n = 8$/*korrekte afleiding, m.a.w. $n = 8$* (3) ✓✓ expansion ✓ answer (3)
3.5	$T_n = -3n + 23$ $T_{37} = -3(37) + 23$ $T_{37} = -88$ **OR/*OF*** $T_n = -6n + 26$ $T_{19} = -6(19) + 26$ $T_{19} = -88$ **OR/*OF*** **20** ; 17 ; **14** ; 11 ; **8** ; 5 ; **2** ; –1 ; **–4** ; –7 ; **–10**; –13; **–16**; –19; **–22**; –25; **–28**; –31; **–34**; –37; **–40**; –43; **–46**; –49; **–52**; –55; **–58**; –61; **–64**; –67; **–70**; –73; **–76**; –79; **–82**; –85; **–88** Answer = –88	✓$-3(37)+23$ ✓answer/*antwoord* (2) ✓$-6(19)+26$ ✓answer/*antwoord* (2) ✓ expansion ✓ answer (2)
		[10]

QUESTION/*VRAAG* 4		
4.1.1	$4^2 = 16$	✓answer/*antwoord* (1)
4.1.2	$13^2 = 169$	✓answer/*antwoord* (1)
4.1.3	$T_n = n^2$	✓answer/*antwoord* (1)
4.2	$T_n = 2n-1$ $43 = 2n-1$ $44 = 2n$ $n = 22$ Total dots $= n^2 = 22^2$ $= 484$ **OR/*OF*** $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 + 25 + 27 + 29 + 31 + 33 + 35 + 37 + 39 + 41 + 43$ $= 484$	✓ $T_n = 2n-1$ ✓ $n = 22$ ✓answer/*antwoord* (3) ✓✓ correct expansion ✓ answer (3)
		[6]

QUESTION/*VRAAG* 5		
5.1.1	D(0 ; –3)	✓ x value/*x-waarde* ✓ y value/*y-waarde* (2)
5.1.2	$y > -4$ **OR/*OF*** $y \in (-4 ; \infty)$	✓answer/*antwoord* (1)
5.2.1	$0 = \left(\frac{1}{2}\right)^x - 4$ $2^{-x} = 4$ $2^{-x} = 2^2$ $x = -2$ A(–2 ; 0)	✓equating g to 0/ *gelykstelling aan 0* ✓answer as a coordinate/*antwoord as 'n koordinaat* (2)

Answer only of A(–2 ; 0): 2/2 marks

5.2.2	$f(x)=ax^2+q$ $3=a(1)^2+q$ at E(1 ; 3) $3=a+q$.....(1) $0=a(-2)^2+q$ at A(−2 ; 0) or B(2 ; 0) $0=4a+q$ $q=-4a$.....(2) $a=-1$ $q=4$ **OR/*OF*** $y=a(x-2)(x+2)$ $3=a(1-2)(1+2)$ $3=-3a$ $a=-1$ $y=-(x^2-4)$ $y=-x^2+4$ $q=4$	✓subst. (1 ; 3)/ *verv. (1 ; 3)* ✓subst. coordinates of A or B/*verv. die coordinate van A of B* ✓ *a* value/*a-waarde* ✓ *q* value/*q-waarde* (4) ✓ $y=a(x-2)(x+2)$ ✓ subst of (1 ; 3) ✓ *a* value ✓ *q* value (4)
5.3.1	C(0 ; 4) D(0 ; −3) $CD=y_C-y_D$ $=4-(-3)$ = 7 units/*eenhede* ***OR/OF*** $CD=\sqrt{(0-0)^2+(4-(-3))^2}$ $=\sqrt{49}$ $=7$	Answer only: 2/2 marks ✓C(0 ; 4) (indicated or implied) ✓answer/*antwoord* (2) ✓C(0 ; 4) (indicated or implied) ✓answer/*antwoord* (2)
5.3.2	$m=\frac{0-(-3)}{-2-(0)}$ $m=-\frac{3}{2}$ $y=-\frac{3}{2}x-3$	✓subst. into gradient/*verv.* ✓ *m* value/*m-waarde* ✓equation/ *vergelyking* (3)
5.4.1	$-2<x<2$ OR $x\in(-2;2)$	✓critical values/ *kritieke waardes* ✓notation/*notasie* (2)
5.4.2	$x>0$ OR $x\in(0;\infty)$	✓answer/*antwoord* (1)
		[17]

QUESTION/*VRAAG* 6		
6.1.1	$g(x)=\frac{a}{x}+q$ $2=\frac{a}{3}+1$ $a=3$ $\therefore g(x)=\frac{3}{x}+1$	✓$q=1$ ✓subst. of (3 ; 2)/*verv. van (3 ; 2)* ✓a value (3)
6.1.2	$h(x)=x+1$ Answer only: 2/2 marks	✓ $m=1$ ✓answer/*antwoord* (2)
6.2		*g*: ✓ shape of *g* ✓ horizontal asymptote (ca from 6.1.1) ✓ x-intercept *h*: ✓ x and y-intercept (4)
6.3	$f(x)=-\left(\frac{3}{x}+1\right)+5$ $f(x)=-\frac{3}{x}+4$ Answer only: 3/3 marks The equations of the asymptotes are: $x=0$ $y=4$	✓equation of *f*/ *vergelyking van f* ✓$x=0$ ✓$y=4$ (3)
		[12]

QUESTION/*VRAAG* 7		
7.1	Total amount paid /*Totale bedrag betaal* =R 229 ×24 =R 5 496	✓answer/*antwoord* (1)
7.2	$A = P(1+i.n)$ $5\,496 = P(1+0{,}075\times 2)$ P = R 4 779,13	✓ $n = 2$ ✓correct subst. into correct formula/*verv.* (2)
7.3	Interest/*Rente* = R 5 496 – R 4 779,13 = R 716,87	✓answer/*antwoord* (1)
7.4	Insurance/*Versekering* $= \frac{R4779{,}13\times 0{,}115}{12}$ = R45,80 New monthly payments/*Nuwe maandelikse paaiement* = R45,80 + R229 = R274,80 **OR/*OF*** Total insurance = 4779,13×0,115×2 = R1 099,20 Total cost = 5 496+ 1099,20 = R 6595,20 Total monthly payment $= \frac{6595{,}20}{24}$ = R 274,80 **OR/*OF*** Total insurance = 4779,13×0,115×2 = R1 099,20 Total insurance per month $= \frac{1099{,}20}{24}$ = 45,80 Total monthly payment = R 229 + R45,80 = R274,80	✓ 4779,13×0,115 ✓dividing by 12/ *deling deur 12* ✓answer/*antwoord* (3) ✓ 4779,13×0,115×2 ✓ total cost ✓ answer (3) ✓ 4779,13×0,115×2 ✓ insurance per month ✓ answer (3)

7.5	$A = P(1+i)^n$ $5100 = 4779{,}13(1+i)^2$ $i = \sqrt{1{,}067139835} - 1$ $i = 0{,}03302460526$ Inflation rate/*Inflasiekoers* = 3,30%	✓formula/*formule* ✓correct subst. of A and P/*verv.* ✓simplification/ *vereenvoudiging* ✓answer/*antwoord* (4)
		[11]

QUESTION/*VRAAG* 8		
8.1.1 (a)	$P(B) = 1 - P(B')$ $= 1 - \frac{3}{8}$ $= \frac{5}{8}$ Answer only: 2/2 marks	✓formula ✓answer/*antwoord* (2)
8.1.1(b)	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $\frac{5}{7} = \frac{2}{5} + \frac{5}{8} - P(A \text{ and } B)$ $P(A \text{ and } B) = \frac{87}{280}$ $= 0{,}31$	✓identity ✓subst./*verv.* ✓answer/*antwoord* (3)
8.1.2	Not mutually exclusive events. $P(A \text{ and } B) \neq 0$	✓NOT/*NIE* ✓reason/*rede* (2)
8.2.1	$P(A \cap B)$ **OR/*OF*** P(A and B)	✓answer/*antwoord* (1) ✓answer/*antwoord* (1)
8.2.2	$P(A \cup B)'$ **OR/*OF*** $P(A \text{ or } B)'$ **OR/*OF*** 1 – P(A or B)	✓answer/*antwoord* (1) ✓answer/*antwoord* (1) ✓answer/*antwoord* (1)
8.2.3	P(A or B) – P(A and B) **OR/*OF*** P(only A) + P(only B)	✓answer/*antwoord* (1) ✓answer/*antwoord* (1)
8.3	8.2.3	✓answer/*antwoord* (1)
		[11]
	TOTAL/*TOTAAL*	**[100]**