basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 11

MATHEMATICS P1/*WISKUNDE V1*

NOVEMBER 2018

MARKING GUIDELINES/*NASIENRIGLYNE*

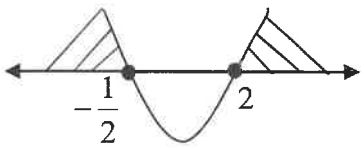
MARKS/*PUNTE*: 150

These marking guidelines consist of 18 pages.
Hierdie nasienriglyne bestaan uit 18 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 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	$x(2x+1)=0$ $x=0$ or/*of* $x=-\frac{1}{2}$	✓ $x = 0$ ✓ $x=-\frac{1}{2}$ (2)
1.1.2	$5x^2+2x-6=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\frac{-(2)\pm\sqrt{(2)^2-4(5)(-6)}}{2(5)}$ $=\frac{5\pm\sqrt{124}}{10}$ $x=0,91$ or/*of* $x=-1,31$	✓ substitution into correct formula/ *vervanging in korrekte formule* ✓ answer/*antw.* ✓ answer/*antw.* (3)
1.1.3	$2x^2-2\geq 3x$ $2x^2-3x-2\geq 0$ $(2x+1)(x-2)\geq 0$  $x\leq -\frac{1}{2}$ or/*of* $x\geq 2$	✓std form/*stand. vorm* ✓factors or using formula/ *faktore of gebruik formule* ✓✓ $x\leq -\frac{1}{2}$ or/*of* $x\geq 2$ (4)

1.1.4

$$\sqrt{2x+5}-\frac{3}{\sqrt{2x+5}}=-2$$

Let $\sqrt{2x+5}=k$

$$k-\frac{3}{k}=-2$$
$$k^2-3=-2k$$
$$k^2+2k-3=0$$
$$(k+3)(k-1)=0$$
$$k=-3 \text{ or/}of\ k=1$$

✓changing to quadratic/ *verander na kwadraties*
✓factors or using formula/ *faktore of gebruik formule*

✓$k=3$ or/*of* $k=1$

$\sqrt{2x+5}=-3$ *no solution* or/*of* $\sqrt{2x+5}=1$

$$2x+5=1$$
$$2x=-4$$
$$x=-2$$

✓no solution/ *geen oplossing*

✓square both sides/ *kwadreer beide kante*
✓ $x=-2$

OR/*OF*

$$\sqrt{2x+5}-\frac{3}{\sqrt{2x+5}}=-2$$
$$\left(\sqrt{2x+5}\right)^2-3=-2\sqrt{2x+5}$$
$$\left(\sqrt{2x+5}\right)^2+2\left(\sqrt{2x+5}\right)-3=0$$
$$\left(\sqrt{2x+5}+3\right)\left(\sqrt{2x+5}-1\right)=0$$
$$\sqrt{2x+5}=-3 \text{ or } \sqrt{2x+5}=1$$

$\sqrt{2x+5}=-3$ *no solution* or/of $\sqrt{2x+5}=1$

$$2x+5=1$$
$$2x=-4$$
$$x=-2$$

✓changing to quadratic/ *verander na kwadraties*
✓factors/*fakt.*
✓ $\sqrt{2x+5}=-3$ or/*of* $\sqrt{2x+5}=1$

✓ no solution/ *geen oplossing*

✓square both sides/ *kwadreer beide kante*
✓ $x=-2$

OR/OF

(6)

(6)

	$\sqrt{2x+5}-\dfrac{3}{\sqrt{2x+5}}=-2$ $2x+5-3=-2\sqrt{2x+5}$ $2x+2=-2\sqrt{2x+5}$ $(2x+2)^2=\left(-2\sqrt{2x+5}\right)^2$ $4x^2+8x+4=4(2x+5)$ $4x^2+8x+4=8x+20$ $4x^2-16=0$ $x^2-4=0$ $(x+2)(x-2)=0$ $x=-2$ *or / of* $x\neq 2$	✓Multiplying by/ *Vermenigv. met* $\sqrt{2x+5}$ / ✓square both sides/ *kwadreer beide kante* ✓std form/ *vorm* ✓factors/*fakt.* ✓ $x\neq 2$ ✓ $x=-2$ (6)
1.2	$y+x=2$ and/en $x^2+3xy+8=0$ $\therefore\ y=2-x$ $x^2+3x(2-x)+8=0$ $x^2+6x-3x^2+8=0$ $-2x^2+6x+8=0$ $x^2-3x-4=0$ $(x-4)(x+1)=0$ $x=4$ or $x=-1$ $y=2-4$ or / *of* $y=2-(-1)$ $y=-2$ $y=3$ **OR/*OF*** $y+x=2$ and $x^2+3xy+8=0$ $\therefore\ x=2-y$ $(2-y)^2+3(2-y)y+8=0$ $4-4y+y^2+6y-3y^2+8=0$ $-2y^2+2y+12=0$ $y^2-y-6=0$ $(y-3)(y+2)=0$ $y=3$ or $y=-2$ $x=2-3$ or $x=2-(-2)$ $x=-1$ or $x=4$	✓ $y=2-x$ ✓substitution/*verv.* ✓std form/*stand. vorm* ✓factors or using formula/ *faktore of gebruik formule* ✓both x-values/*wrdes* ✓both y-values/*wrdes* (6) ✓ $x=2-y$ ✓substitution/*verv.* ✓std form/*stand. vorm* ✓factors or using formula/ *faktore of gebruik formule* ✓both y-values/*wrdes* ✓both x-values/*wrdes* (6)

1.3	$x=\frac{4\pm\sqrt{16-4m(-m+5)}}{2m}$ For non-real roots/Vir nie-reële wortels: $16-4m(-m+5)<0$ $16+4m^2-20m<0$ $m^2-5m+4<0$ $(m-4)(m-1)<0$ $1<m<4$	✓$16-4m(-m+5)<0$ ✓factors or using formula/ *faktore of gebruik formule* ✓✓$1<m<4$ (4)
1.4	$-x^2+4x+12$ $=-1(x^2-4x-12)$ $=-1(x^2-4x+4-4-12)$ $=-1(x-2)^2+16$ The maximum value of/*Die maksimum waarde van* $-x^2+4x+12$ is 16 $\therefore$ max value of $\sqrt{-x^2+4x+12}$ is 4 **OR/*OF*** $\sqrt{-x^2+4x+12}$ max when $x=\frac{-b}{2a}$ $=\frac{-4}{2(-1)}$ $=2$ max value $y=-(2)^2+4(2)+12$ $=16$ The maximum value of/*Die maksimum waarde van* $-x^2+4x+12$ is 16 $\therefore$ max value of $\sqrt{-x^2+4x+12}$ is 4	✓$-1(x^2-4x-12)$ ✓$-1(x^2-4x+4-4-12)$ ✓$-1(x-2)^2+16$ ✓$\sqrt{16}=4$ (4) **OR/*OF*** ✓subst/*verv.* ✓x-value/*waarde* ✓y-value/*waarde* ✓ $\sqrt{16}=4$ (4) **[29]**

QUESTION/*VRAAG* 2

2.1	$\frac{2^{x-3}-3.2^{x+1}}{2^{x-2}}$ $=\frac{2^x.2^{-3}-3.2^x.2^1}{2^x.2^{-2}}$ $=\frac{2^x\left(2^{-3}-3.2\right)}{2^x.2^{-2}}$ $=\frac{\frac{1}{8}-6}{\frac{1}{4}}$ $=-\frac{47}{2}$	✓separate bases/*aparte basisse* ✓common factor/*gemene fakt.* ✓$\left(2^{-3}-3.2\right)$ ✓answer/*antw.* (4)
2.2.1	$16x^{-\frac{3}{2}}=2$ $x^{-\frac{3}{2}}=\frac{1}{8}$ $\left(x^{-\frac{3}{2}}\right)^{-\frac{2}{3}}=\left(2^{-3}\right)^{-\frac{2}{3}}$ $x=4$ **OR/*OF*** $2-16x^{\frac{-3}{2}}=0$ $2=2^4.x^{\frac{-3}{2}}$ $2^{-3}=x^{\frac{-3}{2}}$ $x=2^{-3\times\frac{2}{-3}}$ $x=4$	✓isolating/*isoleer x* ✓raising both sides by/*verhef albei kante met* $-\frac{2}{3}$ ✓answer/*antw.* (3) ✓prime base/*priembasis* ✓exp law/*eksp. wet* ✓answer/*antw.* (3)

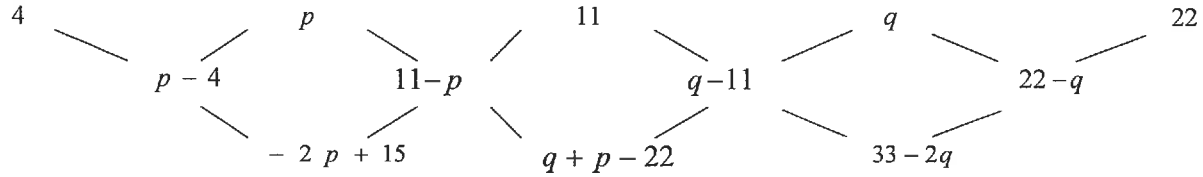
2.2.2	$4^x + 8 = 9.2^x$ $(2^2)^x - 9.2^x + 8 = 0$ $2^{2x} - 9.2^x + 8 = 0$ $(2^x - 8)(2^x - 1) = 0$ $2^x = 8$ or $2^x = 1$ $2^x = 2^3$ $2^x = 2^0$ $x = 3$ $x = 0$ **OR/*OF*** $4^x + 8 = 9.2^x$ $(2^2)^x - 9.2^x + 8 = 0$ $2^{2x} - 9.2^x + 8 = 0$ Let $2^x = k$ $k^2 - 9.k + 8 = 0$ $(k - 8)(k - 1) = 0$ $k = 8$ *or* $k = 1$ $2^x = 8$ $2^x = 2^0$ $2^x = 2^3$ $x = 0$ $x = 3$	✓standard form/*stand. vorm* ✓ $2^x = 8$ or $2^x = 1$ ✓ $x = 3$ ✓ $x = 0$ (4) ✓standard form/*stand. vorm* ✓ $2^x = 8$ or $2^x = 1$ ✓ $x = 3$ ✓ $x = 0$ (4)
2.2.3	$\sqrt[x]{9} = 243$ $3^{\frac{2}{x}} = 3^5$ $\frac{2}{x} = 5$ **OR/ OF** $x = \frac{2}{5}$ $\left(\sqrt[x]{3^2}\right)^x = \left(3^5\right)^x$ $3^2 = 3^{5x}$ $2 = 5x$ $x = \frac{2}{5}$	✓exp form/*eksp. vorm* ✓equating the exp/*gelykst van eks* ✓answer/*antw.* (3)
2.3	$\frac{\sqrt{p^2 - q^2} \times (p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $= \frac{\sqrt{(p-q)(p+q)} \times (p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $= \frac{(p-q)^{\frac{1}{2}}(p+q)^{\frac{1}{2}} \times (p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $= (p+q)^{\frac{1}{2}+\frac{5}{2}}$ $= (p+q)^3$	✓difference of 2 squares *verskil van 2 kwadrate* ✓exponent law/*eksponentwet* ✓answer/*antw.* (3)

	OR/OF $\frac{\sqrt{p^2-q^2}\times(p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $=\sqrt{\frac{(p-q)(p+q)(p+q)^5}{(p-q)}}$ $=\sqrt{(p+q)^6}$ $=(p+q)^3$	✓difference of 2 squares *verskil van 2 kwadrate* ✓exponent law/*eksponentwet* ✓answer/*antw.* (3) **[17]**

QUESTION/*VRAAG* 3

3.1.1	7 2 -3 -5 -5 $T_n = an+b$ $=-5n+12$	✓$-5n$ ✓12 (2)
3.1.2	$T_{20}=-5(20)+12$ $=-88$	✓substitution/*verv.* ✓answer/*antw.* (2)
3.1.3	$-5n+12=-138$ $-5n=-150$ $n=30$ 30^{th} term(T_{30})	✓substitution/*verv.* ✓answer/*antw.* (2)
3.2	6 $2x+1$ $3x-3$ $2x-5$ $x-4$ $2x-5=x-4$ $x=1$	✓$2x-5$ and/*en* $x-4$ ✓equating/*verg.* ✓answer/*antw.* (3) **[9]**

QUESTION/*VRAAG* 4

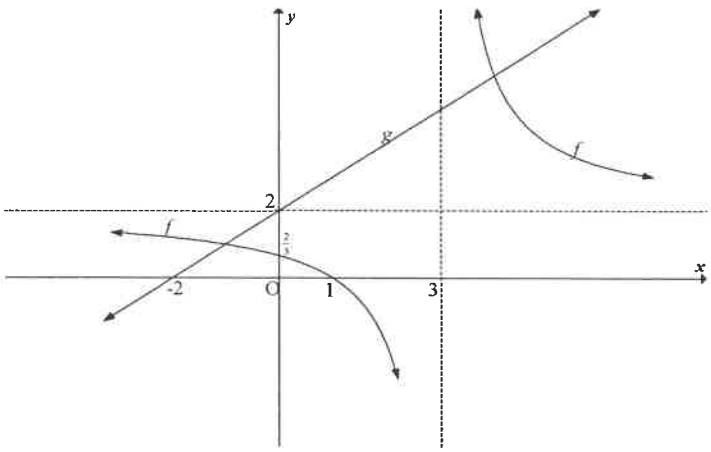


4.1	1st difference/*1ste verskil*: $p-4;\ 11-p;\ q-11;\ 22-q$ 2nd difference/*2de verskil*: $-2p+15;\ q+p-22;\ 33-2q$ $-2p+15=1$ $-2p=-14$ $p=7$ $33-2q=1$ or/*of* $q+p-22=1$ $-2q=-32$ $q+7-22=1$ $q=16$ $q=16$ **OR/ OF** $-2p+15=1$ $-2p=-14$ $p=7$ 4 7 11 16 3 4 5 1 1	✓ $p-4;\ 11-p;\ q-11;\ 22-q$ ✓ $-2p+15;\ q+p-22;\ 33-2q$ ✓ $-2p+15=1$ and/*en* $33-2q=1$ (3) ✓ $p-4;\ 11-p$ ✓ $-2p+15=1$ ✓subst. of p in pattern to find q/ *vervang p in patroon om q te vind* (3)

4.2	$2a=1$ $a=\frac{1}{2}$ $3a+b=3$ $3\left(\frac{1}{2}\right)+b=3$ $b=\frac{3}{2}$ $a+b+c=4$ $\frac{1}{2}+\frac{3}{2}+c=4$ $c=2$ $T_n=\frac{1}{2}n^2+\frac{3}{2}n+2$	✓ $a=\frac{1}{2}$ ✓ $b=\frac{3}{2}$ ✓ $c=2$ ✓ $T_n=\frac{1}{2}n^2+\frac{3}{2}n+2$ (4)
	OR/OF	
	$T_0=c=2$ $2a=1$ $a=\frac{1}{2}$ $T_n=an^2+bn+c$ $4=\frac{1}{2}n^2+b(1)+2$ $b=\frac{3}{2}$	✓ $c=2$ ✓ $a=\frac{1}{2}$ ✓ $b=\frac{3}{2}$
	$T_n=\frac{1}{2}n^2+\frac{3}{2}n+2$	✓ $T_n=\frac{1}{2}n^2+\frac{3}{2}n+2$ (4)

4.3	$T_n = 232$ $\frac{1}{2}n^2 + \frac{3}{2}n + 2 = 232$ $\frac{1}{2}n^2 + \frac{3}{2}n - 230 = 0$ $n^2 + 3n - 460 = 0$ $(n+23)(n-20) = 0$ $n \neq -23$ *or* $n = 20$	✓$\frac{1}{2}n^2 + \frac{3}{2}n + 2 = 232$ ✓standard form/*std. vorm* ✓factors/subst quad. eq. */faktore/ verv kwadr. verg* ✓selecting/*kies* $n = 20$ (4)
4.4	$\frac{1}{2}n^2 + \frac{3}{2}n + 2 + \frac{1}{2}(n+1)^2 + \frac{3}{2}(n+1) + 2 = 1227$ $\frac{1}{2}n^2 + \frac{3}{2}n + 2 + \frac{1}{2}(n^2 + 2n + 1) + \frac{3}{2}n + \frac{3}{2} + 2 = 1227$ $\frac{1}{2}n^2 + \frac{3}{2}n + 2 + \frac{1}{2}n^2 + n + \frac{1}{2} + \frac{3}{2}n + \frac{3}{2} + 2 = 1227$ $n^2 + 4n + 6 = 1227$ $n^2 + 4n - 1221 = 0$ $(n+37)(n-33) = 0$ $n \neq -37 \quad n = 33$ $T_{34} - T_{33} = \frac{1}{2}(34)^2 + \frac{3}{2}(34) + 2 - \left(\frac{1}{2}(33)^2 + \frac{3}{2}(33) + 2\right)$ $T_{34} - T_{33} = 631 - 596$ $T_{34} - T_{33} = 35$	✓subst into/*verv. in* $T_n + T_{n+1} = 1227$ ✓expansion/*ontw.* ✓standard form/*std. vorm* ✓value of/*wrde van* n ✓answer/*antw.* (5) **[16]**

QUESTION/*VRAAG* 5

5.1	$x=3$ $y=2$	✓$x=3$ ✓$y=2$ (2)
5.2	$0=\frac{4}{x-3}+2$ $-2=\frac{4}{x-3}$ $-2(x-3)=4$ $-2x+6=4$ $x=1$ **OR/OF** $(1;0)$	✓subst./*verv.* $y=0$ ✓simplification/*vereenv.* ✓answer/*antw.* (3) ✓✓✓answer/*antw* (3)
5.3	$y=\frac{4}{0-3}+2$ $=\frac{2}{3}$ **OR/OF** $\left(0;\frac{2}{3}\right)$	✓subst/*verv.* $x=0$ ✓answer/*antw.* (2) ✓✓answer/*antw* (2)
5.4		For/*Vir f* ✓asymptotes/*asimptote* ✓shape/*vorm* ✓x- and y- int. /*afsnit* For/*Vir g* ✓x-int./*afsnit* ✓y-int./*afsnit* (5)

5.5	$\frac{4}{x-3}+2=x+2$ $\frac{4}{x-3}=x+2-2$ $\frac{4}{x-3}=x$ $x(x-3)=4$ $x^2-3x-4=0$ $(x-4)(x+1)=0$ $x=4$ or $x=-1$	✓$\frac{4}{x-3}+2=x+2$ ✓std vorm/*stand. vorm* ✓factors/*faktore* ✓answers/*antw.* (4)
5.6	$-1<x<3$	✓✓answer/*antwoord* (2)
5.7	$y=x+c$ $2=(3)+c$ $-1=c$ $\therefore y=x-1$ Is an axis of symmetry of/ *simmetrie-as van f* $Q(\sqrt{4}+3;\sqrt{4}+2)=Q(5;4)$ **OR/ OF** $x-1=\frac{4}{x-3}+2$ $x-3=\frac{4}{x-3}$ $(x-3)^2=4$ $x^2-6x+5=0$ $(x-5)(x-1)=0$ $x=5$ *or* $x=1$ $y=5-1=4$ $Q(5;4)$	✓$Q(\sqrt{4}+3;\sqrt{4}+2)$ ✓ 5 ✓ 4 (3) ✓equating / *vergelyk* ✓ 5 ✓ 4 (3) **[21]**

QUESTION/*VRAAG* 6

6.1	$y=-4$	✓answer/*antwoord* (1)
6.2	$D(3;25)$	✓3 ✓25 (2)
6.3	$y\leq 25$ *or* $y\in(-\infty;25]$	✓answer/*antwoord* (1)
6.4	$f(0)=-(x-3)^2+25$ $=-(0-3)^2+25$ $=16$ $\quad E(0;16)$ $g(0)=2\left(\frac{1}{2}\right)^{0+1}-4$ $=-3$ $\quad B(0;-3)$ $EB=16-(-3)=19$ units/*eenhede*	✓substitute/*verv.* x=0 ✓$f(0)=16$ ✓$g(0)=-3$ ✓answer/*antwoord* (4)
6.5	$x>3$ or/*of* $x\in(3;\infty)$ Accept/*Aanvaar* $x\geq 3$ or/*of* $x\in[3;\infty)$	✓✓answer/*antwoord* (2)

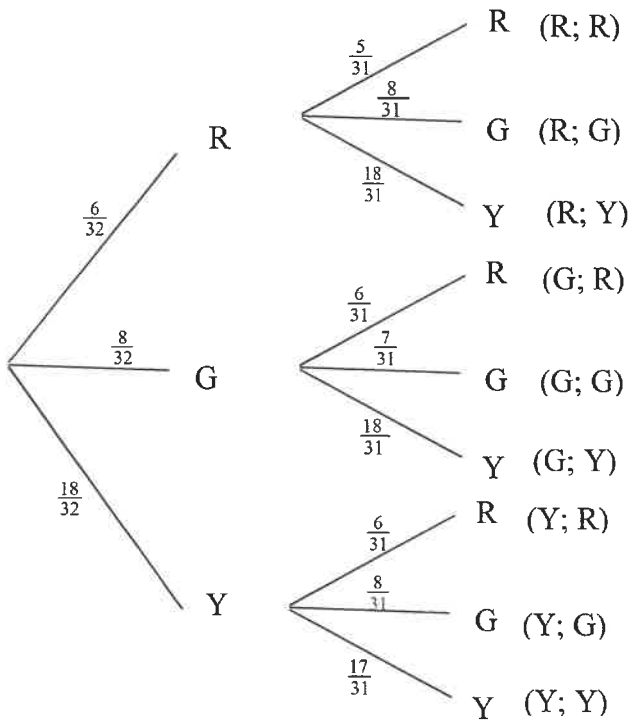
6.6	$0=2\left(\frac{1}{2}\right)^{x+1}-4$	✓substitution/*verv.*
	$4=2\left(\frac{1}{2}\right)^{x+1}$	
	$2=\left(\frac{1}{2}\right)^{x+1}$	
	$2=2^{-x-1}$	✓equating exponent/*gelykst. eksp.*
	$1=-x-1$	✓answer/*antwoord*
	$x=-2$	
	A(–2;0)	
	B(0;–3)	
	Ave gradient/Gemid gradiënt $=\frac{y_2-y_1}{x_2-x_1}$	
	$=\frac{-3-0}{0+2}$	✓subst. into correct formula /*verv. in formule*
	$=-\frac{3}{2}$	✓answer/*antwoord*
	OR/ OF	(5)
	$-(x-3)^2+25=0$	✓substitution/*verv.*
	$(x-3)^2=25$	
	$x-3=5 \quad or \quad x-3=-5$	✓factors or using formula/ *faktore of gebruik formule*
	$x=8 \qquad\qquad x=-2$	
	A(–2;0)	✓answer/*antwoord*
	B(0;–3)	
	Ave gradient/Gemid gradiënt $=\frac{y_2-y_1}{x_2-x_1}$	
	$=\frac{-3-0}{0+2}$	✓subst. into correct formula /*verv. in formule*
	$=-\frac{3}{2}$	✓answer/*antwoord*
		(5)

6.7	$t(x)=-g(x)$ $=-\left(2\left(\frac{1}{2}\right)^{x+1}-4\right)$ $=-2\left(\frac{1}{2}\right)^{x+1}+4$ Range/*Waardeversameling*: $y<4$ or $y\in(-\infty;4)$	✓ $-2\left(\frac{1}{2}\right)^{x+1}+4$ ✓ $y<4$ or $y\in(-\infty;4)$ (2)
6.8	Turning point/ draaipunt ; (3;27)	✓3 ✓27 (2)
6.9	$f(x)=-(x-3)^2+25$ $=-x^2+6x+16$ $-x^2+6x+16=2x+k$ $-x^2+4x+16-k=0$ tangent has one point of intersection thus two equal roots/ raaklyn het een snypunt dus twee gelyke wortels $\Delta=(4)^2-4(-1)(16-k)=0$ $16+64-4k=0$ $80=4k$ $k=20$	✓ $-x^2+6x+16$ ✓equating/*vergelyk* ✓ $(4)^2-4(-1)(16-k)=0$ ✓answer/*antw.* (4) **[23]**

QUESTION/*VRAAG* 7

7.1	$1+i_{eff}=\left(1+\frac{i_{nom}}{m}\right)^m$ $1+i_{eff}=\left(1+\frac{0{,}115}{12}\right)^{12}$ $i_{eff}=\left(1+\frac{0{,}115}{12}\right)^{12}-1$ $i_{eff}=12{,}13\%$	✓formula/*form.* ✓$i=\frac{0{,}115}{12}$ ✓answer/*antw.* (3)
7.2	$A=P(1-i)^n$ $=4\,700(1-0{,}18)^4$ $=R\,2124{,}97$	✓formula/*form.* ✓substitution/*verv.* ✓answer/*antw.* (3)
7.3.1	$A=P(1+i)^n$ $=20\,000\left(1+\frac{0{,}072}{4}\right)^{2\times4}$ $=R\,23\,068{,}12$	✓formula/*form.* ✓substitution/*verv.* ✓answer/*antw.* (3)
7.3.2	$A=P(1+i)^n$ $=23068{,}12\left(1+\frac{0{,}078}{12}\right)^{2\times12}$ $=R26\,949{,}12$ $R26\,949{,}12-R2500$ $=R24\,449{,}12$ $A=P(1+i)^n$ $=24\,449.12\left(1+\frac{0{,}078}{12}\right)^{3\times12}$ $=R30\,871{,}61$ **OR/*OF*** $A=23\,068{,}12\left(1+\frac{0{,}078}{12}\right)^{12\times5}-2500\left(1+\frac{0{,}078}{12}\right)^{12\times3}$ $=R30\,871{,}48$	✓$\frac{0{,}078}{12}$ and $n=24$ ✓A(after 2 years) − R2 500 ✓$n=36$ ✓answer/*antw.* (4) ✓$i=\frac{0{,}078}{12}$ and $n=60$ ✓✓$-2500\left(1+\frac{0{,}078}{12}\right)^{12\times3}$ ✓ answer/*antw.* (4)
		[13]

QUESTION/*VRAAG* 8

8.1	Given/*Gegee*: P(G) = 0,25 Let x be the total number of balls $P(G)=\frac{8}{x}=\frac{1}{4}$ $x=32$ $n(S)=32$ **OR/OF** Let x be the number of yellow balls $\therefore x+14$ be the total number of balls $P(G)=\frac{8}{x+14}=\frac{1}{4}$ $x+14=32$ $n(S)=32$	✓ $\frac{8}{x}=\frac{1}{4}$ (1) ✓ $\frac{8}{x+14}=\frac{1}{4}$ (1)
8.2		✓18 (number of yellow balls/ *aantal geel balle*) ✓branches/*takke* ✓probabilities/*waarskynlikhede* ✓outcomes/*uitkomste* (4)
8.3	$P(G,G)+P(R,R)+P(Y,Y)$ $=\left(\frac{8}{32}\times\frac{7}{31}\right)+\left(\frac{6}{32}\times\frac{5}{31}\right)+\left(\frac{18}{32}\times\frac{17}{31}\right)$ $=\frac{49}{124}$	✓$\left(\frac{8}{32}\times\frac{7}{31}\right)$ ✓$\left(\frac{6}{32}\times\frac{5}{31}\right)$ ✓$\left(\frac{18}{32}\times\frac{17}{31}\right)$ ✓answer/ *antw* (4) **[9]**

QUESTION/*VRAAG* 9

9.1	$P(V) \times P(M)$ $\frac{32}{150} \times \frac{67}{150} = 0,095$ $P(V \text{ and/en } M) = \frac{12}{150} = 0,08$ $P(V \text{ and/en } M) \neq P(V) \times P(M)$ The events are not independent/*Die gebeurtenisse is nie onafhanklik* **OR/*OF*** $P(V) \times P(F)$ $\frac{32}{150} \times \frac{83}{150} = 0,118$ $P(V \text{ and } F) = \frac{20}{150} = 0,133$ $P(V \text{ and } F) \neq P(V) \times P(F)$ The events are not independent/*Die gebeurtenisse is nie onafhanklik*	✓ $\frac{32}{150}$ ✓ $\frac{67}{150}$ ✓ $P(V) \times P(M) = 0,095$ ✓ $P(V \text{ and/en } M) = 0,08$ ✓ conclusion/*gevolgtr.* (5) ✓ $\frac{32}{150}$ ✓ $\frac{83}{150}$ ✓ $P(V) \times P(F) = 0,118$ ✓ $P(V \text{ and } F) = 0,133$ ✓ conclusion/*gevolgtr.* (5)
9.2.1	$P(A \text{ and/en } B) = 0,12 \neq 0$ Events are not mutually exclusive/ *Gebeurtenisse nie onderling uitsluitend nie*	✓ $P(A \text{ and } B) \neq 0$ ✓ conclusion/*gevolgtr.* (2)
9.2.2	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $0,83 = P(A) + 4P(A) - 0,12$ $0,95 = 5P(A)$ $P(A) = 0,19$ $P(B) = 4(0,19) = 0,76$	✓ formula/ *formule* ✓ substitution/*verv.* ✓ $P(A)$ ✓ $P(B)$ (4)
9.2.3	$P(\text{not } A) = 1 - P(A)$ $= 1 - 0,19$ $= 0,81$	✓ $P(\text{not } A) = 1 - P(A)$ ✓ answer/*antw.* (2) **[13]**

TOTAL/*TOTAAL*: 150