



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 11

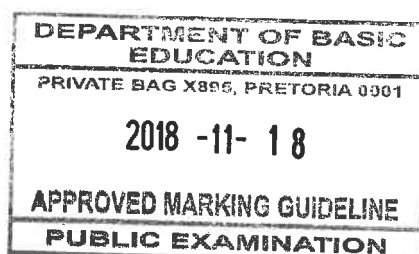
MATHEMATICS P1/WISKUNDE VI

NOVEMBER 2018

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 150

**These marking guidelines consist of 18 pages.
Hierdie nasienriglyne bestaan uit 18 bladsye.**




2018-11-18

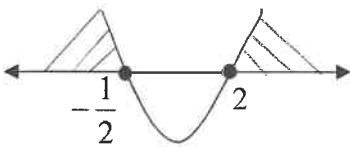
NOTE:

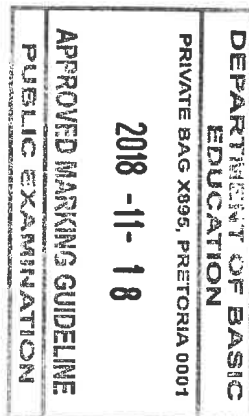
- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

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

<p>1.1.1</p>	$x(2x+1) = 0$ $x = 0 \text{ or/of } x = -\frac{1}{2}$	<p>✓ $x = 0$</p> <p>✓ $x = -\frac{1}{2}$</p> <p style="text-align: right;">(2)</p>
<p>1.1.2</p>	$5x^2 + 2x - 6 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(2) \pm \sqrt{(2)^2 - 4(5)(-6)}}{2(5)}$ $= \frac{5 \pm \sqrt{124}}{10}$ $x = 0,91 \text{ or/of } x = -1,31$	<p>✓ substitution into correct formula/ vervanging in korrekte formule</p> <p>✓ answer/antw.</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(3)</p>
<p>1.1.3</p>	$2x^2 - 2 \geq 3x$ $2x^2 - 3x - 2 \geq 0$ $(2x+1)(x-2) \geq 0$  $x \leq -\frac{1}{2} \text{ or/of } x \geq 2$	<p>✓ std form/stand. vorm</p> <p>✓ factors or using formula/ faktore of gebruik formule</p> <p>✓✓ $x \leq -\frac{1}{2}$ or/of $x \geq 2$</p> <p style="text-align: right;">(4)</p>



1.1.4

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

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

$$k - \frac{3}{k} = -2$$

$$k^2 - 3 = -2k$$

$$k^2 + 2k - 3 = 0$$

$$(k+3)(k-1) = 0$$

$$k = -3 \text{ or/of } k = 1$$

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

no solution

or/of

$$\sqrt{2x+5} = 1$$

$$2x+5=1$$

$$2x = -4$$

$$x = -2$$

OR/OF

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

$$(\sqrt{2x+5})^2 - 3 = -2\sqrt{2x+5}$$

$$(\sqrt{2x+5})^2 + 2(\sqrt{2x+5}) - 3 = 0$$

$$(\sqrt{2x+5} + 3)(\sqrt{2x+5} - 1) = 0$$

$$\sqrt{2x+5} = -3 \text{ or } \sqrt{2x+5} = 1$$

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

no solution

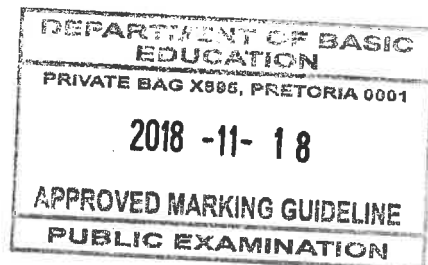
or/of $\sqrt{2x+5} = 1$

$$2x+5=1$$

$$2x = -4$$

$$x = -2$$

OR/OF



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

✓ $k = 3$ or/of $k = 1$

✓ no solution/ geen oplossing

✓ square both sides/

kwadreeer beide kante

✓ $x = -2$

(6)

✓ changing to quadratic/
verander na kwadraties

✓ factors/fakt.

✓ $\sqrt{2x+5} = -3$ or/of $\sqrt{2x+5} = 1$

✓ no solution/ geen oplossing

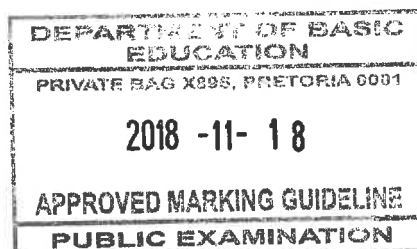
✓ square both sides/

kwadreeer beide kante

✓ $x = -2$

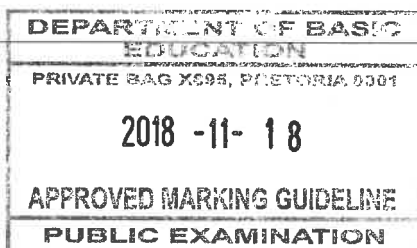
(6)

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

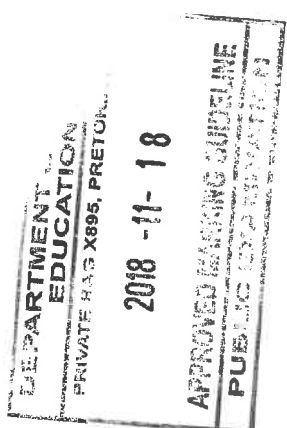


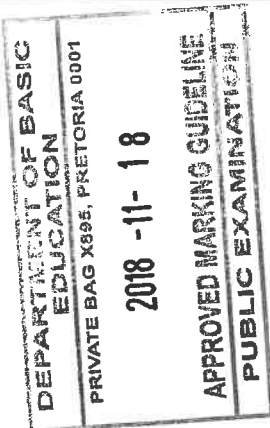
<p>1.3</p>	$x = \frac{4 \pm \sqrt{16 - 4m(-m + 5)}}{2m}$ <p>For non - real roots/Vir nie - reële wortels: $16 - 4m(-m + 5) < 0$</p> $16 + 4m^2 - 20m < 0$ $m^2 - 5m + 4 < 0$ $(m - 4)(m - 1) < 0$ $1 < m < 4$	<p>✓ $16 - 4m(-m + 5) < 0$</p> <p>✓ factors or using formula/ faktore of gebruik formule</p> <p>✓✓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

[29]



QUESTION/VRAAG 2

<p>2.1</p>	$\frac{2^{x-3} - 3 \cdot 2^{x+1}}{2^{x-2}}$ $= \frac{2^x \cdot 2^{-3} - 3 \cdot 2^x \cdot 2^1}{2^x \cdot 2^{-2}}$ $= \frac{2^x(2^{-3} - 3 \cdot 2)}{2^x \cdot 2^{-2}}$ $= \frac{1}{8} - 6$ $= \frac{1}{4} - 6$ $= -\frac{47}{4}$	<p>✓ separate bases/aparte basisse</p> <p>✓ common factor/gemene fakt.</p> <p>✓ $(2^{-3} - 3 \cdot 2)$</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(4)</p>
<p>2.2.1</p>	$16x^{\frac{-3}{2}} = 2$ $x^{\frac{-3}{2}} = \frac{1}{8}$ $\left(x^{\frac{-3}{2}}\right)^{\frac{2}{3}} = \left(\frac{1}{8}\right)^{\frac{2}{3}}$ $x = 4$ <p>OR/OF</p> $2 - 16x^{\frac{-3}{2}} = 0$ $2 = 16x^{\frac{-3}{2}}$ $2^{-3} = x^{\frac{-3}{2}}$ $x = 2^{-3 \times \frac{2}{-3}}$ $x = 4$ <div style="text-align: center; margin-top: 20px;">  </div>	<p>✓ isolating/soleer x</p> <p>✓ raising both sides by/verhef albei kante met $-\frac{2}{3}$</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(3)</p> <p>✓ prime base/priembasis</p> <p>✓ exp law/eksp. wet</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(3)</p>

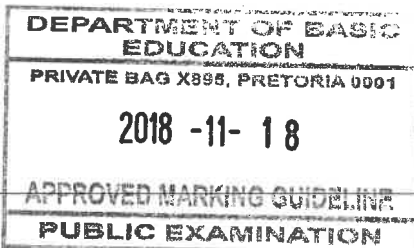
<p>2.2.2</p>	$4^x + 8 = 9 \cdot 2^x$ $(2^2)^x - 9 \cdot 2^x + 8 = 0$ $2^{2x} - 9 \cdot 2^x + 8 = 0$ $(2^x - 8)(2^x - 1) = 0$ $2^x = 8 \quad \text{or} \quad 2^x = 1$ $2^x = 2^3 \quad 2^x = 2^0$ $x = 3 \quad x = 0$ <p>OR/OF</p> $4^x + 8 = 9 \cdot 2^x$ $(2^2)^x - 9 \cdot 2^x + 8 = 0$ $2^{2x} - 9 \cdot 2^x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



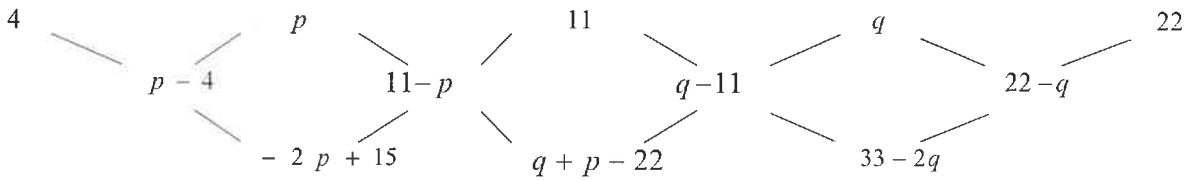
	<p>OR/OF</p> $\frac{\sqrt{p^2 - q^2} \times (p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $= \sqrt{\frac{(p-q)(p+q)(p+q)^5}{(p-q)}}$ $= \sqrt{(p+q)^6}$ $= (p+q)^3$	<p>✓ difference of 2 squares <i>verskil van 2 kwadrate</i></p> <p>✓ exponent law/<i>eksponentwet</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3) [17]</p>
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QUESTION/VRAAG 3

3.1.1	$7 \quad \quad \quad 2 \quad \quad \quad -3$ $\quad \quad \quad \diagdown \quad \diagup \quad \quad \quad \diagdown \quad \diagup$ $\quad \quad \quad -5 \quad \quad \quad -5 \quad \quad \quad$ <p>$T_n = an + b$ $= -5n + 12$</p>	<p>✓ $-5n$ ✓ 12</p> <p style="text-align: right;">(2)</p>
3.1.2	<p>$T_{20} = -5(20) + 12$ $= -88$</p>	<p>✓ substitution/<i>verv.</i> ✓ answer/<i>antw.</i></p> <p style="text-align: right;">(2)</p>
3.1.3	<p>$-5n + 12 = -138$ $-5n = -150$ $n = 30$ 30th term (T_{30})</p>	<p>✓ substitution/<i>verv.</i> ✓ answer/<i>antw.</i></p> <p style="text-align: right;">(2)</p>
3.2	$6 \quad \quad \quad 2x+1 \quad \quad \quad 3x-3$ $\quad \quad \quad \diagdown \quad \diagup \quad \quad \quad \diagdown \quad \diagup$ $\quad \quad \quad 2x-5 \quad \quad \quad x-4 \quad \quad \quad$ <p>$2x - 5 = x - 4$ $x = 1$</p>	<p>✓ $2x - 5$ and/en $x - 4$</p> <p>✓ equating/<i>verg.</i> ✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3) [9]</p>



QUESTION/VRAAG 4



4.1

1st difference/1^{ste} verskil:

$p-4; 11-p; q-11; 22-q$

2nd difference/2^{de} verskil:

$-2p+15; q+p-22; 33-2q$

$-2p+15=1$

$-2p=-14$

$p=7$

$33-2q=1$

$q+p-22=1$

$-2q=-32$ or/of $q+7-22=1$

$q=16$

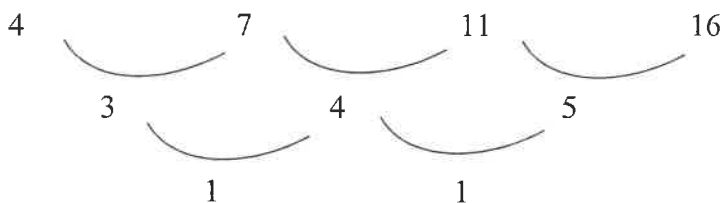
$q=16$

OR/ OF

$-2p+15=1$

$-2p=-14$

$p=7$



✓ $p-4; 11-p; q-11; 22-q$

✓ $-2p+15; q+p-22; 33-2q$

✓ $-2p+15=1$

and/en $33-2q=1$

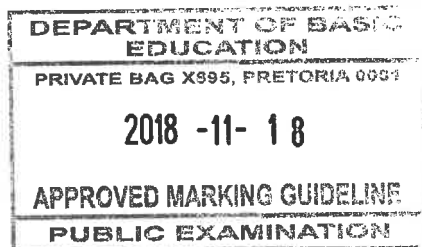
(3)

✓ $p-4; 11-p$

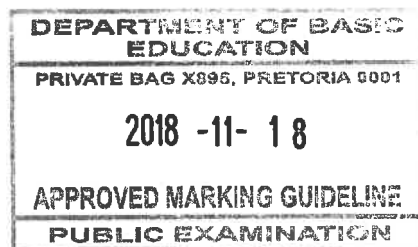
✓ $-2p+15=1$

✓ subst. of p in pattern to find q / vervang p in patroon om q te vind

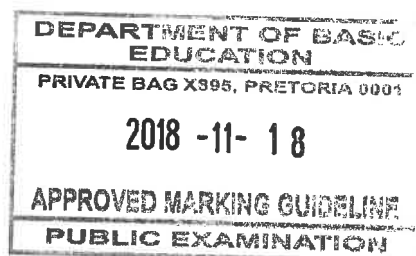
(3)



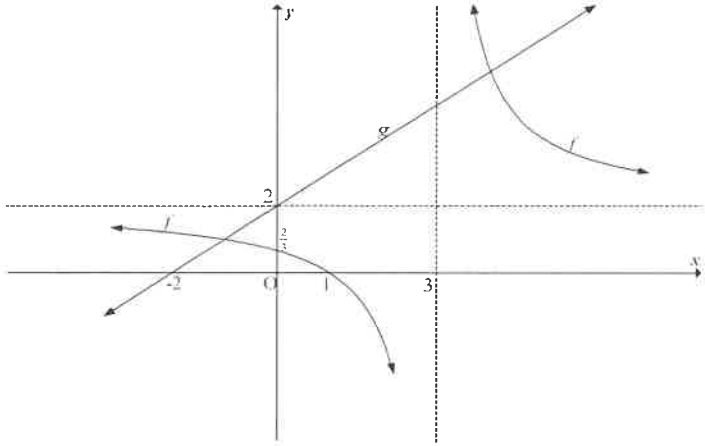
4.2	$2a = 1$ $a = \frac{1}{2}$ $3a + b = 3$ $3\left(\frac{1}{2}\right) + b = 3$ $b = \frac{3}{2}$ $a + b + c = 4$ $\frac{1}{2} + \frac{3}{2} + c = 4$ $c = 2$ $T_n = \frac{1}{2}n^2 + \frac{3}{2}n + 2$ OR/OF $T_0 = c = 2$ $2a = 1$ $a = \frac{1}{2}$ $T_n = an^2 + bn + c$ $4 = \frac{1}{2}n^2 + b(1) + 2$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



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

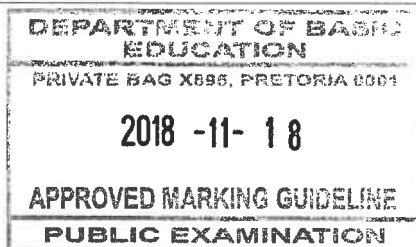


QUESTION/VRAAG 5

<p>5.1</p>	<p>$x=3$ $y=2$</p>	<p>✓ $x=3$ ✓ $y=2$ (2)</p>
<p>5.2</p>	<p>$0 = \frac{4}{x-3} + 2$ $-2 = \frac{4}{x-3}$ $-2(x-3) = 4$ $-2x + 6 = 4$ $x = 1$</p> <p>OR/OF</p> <p>(1; 0)</p>	<p>✓ subst./verv. $y=0$ ✓ simplification/vereenv. ✓ answer/antw. (3)</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DEPARTMENT OF BASIC EDUCATION PUBLIC EXAMINATIONS PRIVATE BAG X955, PRETORIA 0001</p> <p>2018 -11- 18</p> <p>APPROVED MARKING GUIDELINE PUBLIC EXAMINATION</p> </div> <p>✓✓✓ answer/antw. (3)</p>
<p>5.3</p>	<p>$y = \frac{4}{0-3} + 2$ $= \frac{2}{3}$</p> <p>OR/OF</p> <p>$(0; \frac{2}{3})$</p>	<p>✓ subst./verv. $x=0$ ✓ answer/antw. (2)</p> <p>✓✓ answer/antw (2)</p>
<p>5.4</p>		<p>For/Vir <i>f</i></p> <p>✓ asymptotes/asimptote ✓ shape/vorm ✓ x- and y- int./afsnit</p> <p>For/Vir <i>g</i></p> <p>✓ x-int./afsnit ✓ y-int./afsnit (5)</p>

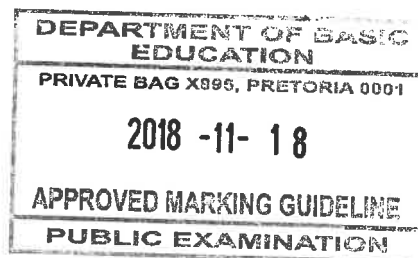


<p>5.5</p>	$\frac{4}{x-3} + 2 = x + 2$ $\frac{4}{x-3} = x + 2 - 2$ $\frac{4}{x-3} = x$ $x(x-3) = 4$ $x^2 - 3x - 4 = 0$ $(x-4)(x+1) = 0$ $x = 4 \text{ or } x = -1$	$\checkmark \frac{4}{x-3} + 2 = x + 2$ $\checkmark \text{std vorm/stand. vorm}$ $\checkmark \text{factors/faktore}$ $\checkmark \text{answers/antw.}$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

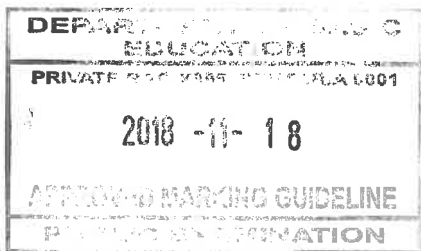


QUESTION/VRAAG 6

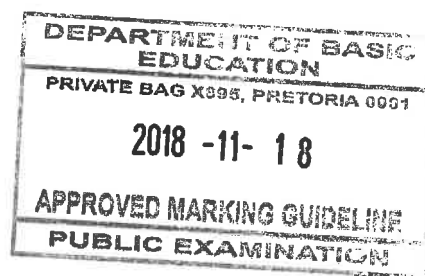
6.1	$y = -4$	✓ answer/antwoord (1)
6.2	D(3;25)	✓3 ✓25 (2)
6.3	$y \leq 25$ or $y \in (-\infty; 25]$	✓ answer/antwoord (1)
6.4	$f(0) = -(x-3)^2 + 25$ $= -(0-3)^2 + 25$ $= 16 \quad E(0;16)$ $g(0) = 2\left(\frac{1}{2}\right)^{0+1} - 4$ $= -3 \quad B(0;-3)$ $EB = 16 - (-3) = 19 \text{ units/eenhede}$	✓ substitute/verv.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



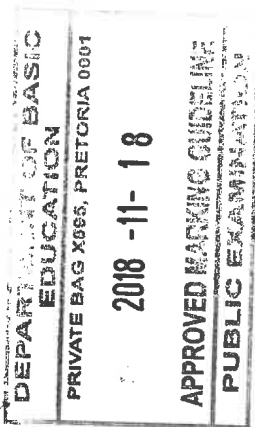
<p>6.6</p>	$0 = 2\left(\frac{1}{2}\right)^{x+1} - 4$ $4 = 2\left(\frac{1}{2}\right)^{x+1}$ $2 = \left(\frac{1}{2}\right)^{x+1}$ $2 = 2^{-x-1}$ $1 = -x - 1$ $x = -2$ <p>A(-2;0) B(0;-3)</p> <p>Ave gradient/Gemid gradiënt = $\frac{y_2 - y_1}{x_2 - x_1}$</p> $= \frac{-3 - 0}{0 + 2}$ $= -\frac{3}{2}$ <p>OR/ OF</p> $-(x-3)^2 + 25 = 0$ $(x-3)^2 = 25$ $x-3 = 5 \quad \text{or} \quad x-3 = -5$ $x = 8 \quad \quad \quad x = -2$ <p>A(-2;0) B(0;-3)</p> <p>Ave gradient/Gemid gradiënt = $\frac{y_2 - y_1}{x_2 - x_1}$</p> $= \frac{-3 - 0}{0 + 2}$ $= -\frac{3}{2}$	<p>✓ substitution/<i>verv.</i></p> <p>✓ equating exponent/<i>gelykst. eksp.</i></p> <p>✓ answer/<i>antwoord</i></p> <p>✓ subst. into correct formula <i>/verv. in formule</i></p> <p>✓ answer/<i>antwoord</i> (5)</p> <p>✓ substitution/<i>verv.</i></p> <p>✓ factors or using formula/ <i>faktore of gebruik formule</i></p> <p>✓ answer/<i>antwoord</i></p> <p>✓ subst. into correct formula <i>/verv. in formule</i></p> <p>✓ answer/<i>antwoord</i> (5)</p>
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6.7	$t(x) = -g(x)$ $= -\left(2\left(\frac{1}{2}\right)^{x+1} - 4\right)$ $= -2\left(\frac{1}{2}\right)^{x+1} + 4$ <p>Range/Waardeversameling: $y < 4$ or $y \in (-\infty; 4)$</p>	$\checkmark -2\left(\frac{1}{2}\right)^{x+1} + 4$ $\checkmark y < 4 \text{ or } y \in (-\infty; 4)$ <p style="text-align: right;">(2)</p>
6.8	Turning point/ draaipunt ; (3;27)	$\checkmark 3$ $\checkmark 27$ <p style="text-align: right;">(2)</p>
6.9	$f(x) = -(x-3)^2 + 25$ $= -x^2 + 6x + 16$ $-x^2 + 6x + 16 = 2x + k$ $-x^2 + 4x + 16 - k = 0$ <p>tangent has one point of intersection thus two equal roots/ raaklyn het een snypunt dus twee gelyke wortels</p> $\Delta = (4)^2 - 4(-1)(16 - k) = 0$ $16 + 64 - 4k = 0$ $80 = 4k$ $k = 20$	$\checkmark -x^2 + 6x + 16$ $\checkmark \text{equating/vergelijk}$ $\checkmark (4)^2 - 4(-1)(16 - k) = 0$ $\checkmark \text{answer/antw.}$ <p style="text-align: right;">(4) [23]</p>



QUESTION/VRAAG 7

<p>7.1</p>	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m$ $1 + i_{eff} = \left(1 + \frac{0,115}{12}\right)^{12}$ $i_{eff} = \left(1 + \frac{0,115}{12}\right)^{12} - 1$ $i_{eff} = 12,13\%$	<p>✓ formula/form.</p> <p>✓ $i = \frac{0,115}{12}$</p> <p>✓ answer/antw. (3)</p>
<p>7.2</p>	$A = P(1 - i)^n$ $= 4\,700(1 - 0,18)^4$ $= R\,2\,124,97$	<p>✓ formula/form.</p> <p>✓ substitution/verv.</p> <p>✓ answer/antw. (3)</p>
<p>7.3.1</p>	$A = P(1 + i)^n$ $= 20\,000\left(1 + \frac{0,072}{4}\right)^{2 \times 4}$ $= R\,23\,068,12$	<p>✓ formula/form.</p> <p>✓ substitution/verv.</p> <p>✓ answer/antw. (3)</p>
<p>7.3.2</p>	$A = P(1 + i)^n$ $= 23\,068,12\left(1 + \frac{0,078}{12}\right)^{2 \times 12}$ $= R26\,949,12$ $R26\,949,12 - R2\,500$ $= R24\,449,12$ $A = P(1 + i)^n$ $= 24\,449,12\left(1 + \frac{0,078}{12}\right)^{3 \times 12}$ $= R30\,871,61$ <p>OR/OF</p> $A = 23\,068,12\left(1 + \frac{0,078}{12}\right)^{12 \times 5} - 2\,500\left(1 + \frac{0,078}{12}\right)^{12 \times 3}$ $= R30\,871,48$	 <p>✓ $\frac{0,078}{12}$ and $n = 24$</p> <p>✓ A(after 2 years) – R2 500</p> <p>✓ $n = 36$</p> <p>✓ answer/antw. (4)</p> <p>✓ $i = \frac{0,078}{12}$ and $n = 60$</p> <p>✓ ✓ $-2\,500\left(1 + \frac{0,078}{12}\right)^{12 \times 3}$</p> <p>✓ answer/antw. (4)</p>
		<p>[13]</p>

QUESTION/VRAAG 8

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



QUESTION/VRAAG 9

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

[13]

TOTAL/TOTAAL: 150

