



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 11

MATHEMATICS P1/WISKUNDE V1

NOVEMBER 2017

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 150

**These marking guidelines consist of 19 pages.
Hierdie nasienriglyne bestaan uit 19 bladsye.**

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12/11/2017

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12/11/2017

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	$(2x - 3)(x + 7) = 0$ $x = \frac{3}{2} \text{ or } x = -7$	$\checkmark x = \frac{3}{2}$ $\checkmark x = -7$
1.1.2	$7x^2 + 3x - 2 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(3) \pm \sqrt{(3)^2 - 4(7)(-2)}}{2(7)}$ $= \frac{-3 \pm \sqrt{65}}{14}$ $x = -0,79 \text{ or } x = 0,36$ <p>OR/ OF</p> $x^2 + \frac{3}{7}x - \frac{2}{7} = 0$ $x^2 + \frac{3}{7}x - \frac{9}{196} = \frac{2}{7} + \frac{9}{196}$ $\left(x + \frac{3}{14}\right)^2 = \frac{65}{196}$ $x + \frac{3}{14} = \frac{\pm\sqrt{65}}{14}$ $x = \frac{-3 \pm \sqrt{65}}{14}$ $x = -0,79 \text{ or } x = 0,36$	<p style="text-align: right;">(2)</p> $\checkmark \text{substitution/vervanging}$ $\checkmark \text{answer/antwoord}$ $\checkmark \text{answer/antwoord}$ $\checkmark \left(x + \frac{3}{14}\right)^2 = \frac{65}{196}$ $\checkmark \text{answer/antwoord}$ $\checkmark \text{answer/antwoord}$ <p style="text-align: right;">(3)</p>

1.1.3	$\sqrt{x-1}+3=x$ $\sqrt{x-1}=x-3$ $(\sqrt{x-1})^2=(x-3)^2$ $x-1=x^2-6x+9$ $x^2-7x+10=0$ $(x-2)(x-5)=0$ $x \neq 2 \text{ or/of } x=5$	<ul style="list-style-type: none"> ✓ isolate/isoleer $\sqrt{\quad}$ sign/teken ✓ squaring/kwadr both sides/ beide kante ✓ std form/stand vorm ✓ factors/fakt ✓ $x=5$ ✓ $x \neq 2$ <p style="text-align: right;">(6)</p>
1.1.4	$x^2 > 3(x+6)$ $x^2 - 3x - 18 > 0$ $(x-6)(x+3) > 0$ <p style="text-align: center;">OR/OF $x < -3$ or $x > 6$ $x \in (-\infty; -3) \cup (6; \infty)$</p>	<ul style="list-style-type: none"> ✓ std form/vorm ✓ factors/fakt ✓ $x < -3$ OR/OF $(-\infty; -3)$ ✓ $x > 6$ OR/OF $(6; \infty)$ <p style="text-align: right;">(4)</p>
1.2	$2y+x=1$ $x=1-2y$ $x^2+y^2+3xy+y=0$ $(1-2y)^2+y^2+3y(1-2y)+y=0$ $1-4y+4y^2+y^2+3y-6y^2+y=0$ $1-y^2=0$ $(1-y)(1+y)=0$ $y=1 \text{ or } y=-1$ $x=-1 \text{ or } x=3$ <p style="text-align: center;">OR/OF</p>	<ul style="list-style-type: none"> ✓ $x=1-2y$ ✓ substitution/verv ✓ std form/stand vorm ✓ factors/fakt ✓ y-values/wrdes ✓ x-values/wrdes

	$2y + x = 1$ $y = \frac{1-x}{2}$ $x^2 + y^2 + 3xy + y = 0$ $x^2 + \left(\frac{1-x}{2}\right)^2 + 3x\left(\frac{1-x}{2}\right) + \frac{1-x}{2} = 0$ $x^2 + \frac{1-2x+x^2}{4} + \frac{3x-3x^2}{2} + \frac{1-x}{2} = 0$ $4x^2 + 1 - 2x + x^2 + 6x - 6x^2 + 2 - 2x = 0$ $-x^2 + 2x + 3 = 0$ $x^2 - 2x - 3 = 0$ $(x-3)(x+1) = 0$ $x = 3 \quad \text{or} \quad x = -1$ $y = -1 \quad \text{or} \quad y = 1$	$\checkmark y = \frac{1-x}{2}$ $\checkmark \text{substitution/verv}$ $\checkmark \text{std form/stand vorm}$ $\checkmark \text{factors/fakt}$ $\checkmark \text{x-values/wrdes}$ $\checkmark \text{y-values/wrdes}$ <p style="text-align: right;">(6)</p>
1.3	$3 - 12k^2 = 0$ $1 - 4k^2 = 0$ $k^2 = \frac{1}{4}$ $k = \pm \frac{1}{2}$ $3 - 12k^2 = 0$ $1 - 4k^2 = 0$ $(1 - 2k)(1 + 2k) = 0$ $k = \frac{1}{2} \quad \text{OR/OF} \quad k = -\frac{1}{2}$	$\checkmark 3 - 12k^2 = 0$ $\checkmark k^2 = \frac{1}{4}$ $\checkmark k = \pm \frac{1}{2}$ <p style="text-align: right;">(3)</p> $\checkmark 3 - 12k^2 = 0$ $\checkmark (1 - 2k)(1 + 2k) = 0$ $\checkmark k = \pm \frac{1}{2}$ <p style="text-align: right;">(3)</p> <p style="text-align: right;">[24]</p>

QUESTION/VRAAG 2

<p>2.1</p>	$\frac{3^{m+4} - 6 \cdot 3^{m+1}}{7 \cdot 3^{m+2}}$ $= \frac{3^{m+1}(3^3 - 6)}{7 \cdot 3^{m+1} \cdot 3}$ $= \frac{3^3 - 6}{7 \cdot 3}$ $= \frac{21}{21}$ $= 1$ <p>OR/OF</p> $\frac{3^{m+4} - 6 \cdot 3^{m+1}}{7 \cdot 3^{m+2}}$ $= \frac{3^m(3^4 - 6 \cdot 3)}{3^m(7 \cdot 3^2)}$ $= \frac{3^m \cdot 63}{3^m \cdot 63}$ $= 1$	<p>✓ common factor/<i>gemene fakt</i> ✓ $3^3 - 6$</p> <p>✓ simplification/<i>vereenv.</i></p> <p>✓ answer/<i>antw.</i></p> <p>✓ common factor /<i>gemene fakt</i> ✓ $(3^4 - 6 \cdot 3)$</p> <p>✓ simplification/<i>vereenv.</i> ✓ answer/<i>antw.</i></p> <p style="text-align: right;">(4)</p>
<p>2.2.1</p>	$x^{\frac{-3}{4}} = 8$ $x^{\frac{-3}{4}} = 2^3$ $x = (2^3)^{\frac{4}{-3}}$ $x = 2^{-4}$ $x = \frac{1}{16}$ <p>OR/OF</p> $x^{\frac{3}{4}} = 8$ $\sqrt[4]{x^{-3}} = 2^3$ $x^{-3} = 2^{12} \quad (2^{12} = 4096)$ $x^{-1} = 2^4 \quad (2^4 = 16)$ $x = 2^{-4}$ $x = \frac{1}{16}$	<p>✓ 2^3</p> <p>✓ rational exponent/ <i>rasionele eksp</i> ✓ answer in any form/<i>antw. in enige vorm</i></p> <p style="text-align: right;">(3)</p> <p>✓ use of surds/<i>gebr van wortls</i> ✓ $x^{-1} = 2^4$</p> <p>✓ answer in any form/<i>antw. in enige vorm</i></p> <p style="text-align: right;">(3)</p>

WAW

2.2.2	$2^{2x} - 2^x = 2$ $2^{2x} - 2^x - 2 = 0$ $(2^x + 1)(2^x - 2) = 0$ $2^x \neq -1 \text{ or } 2^x = 2$ $x = 1$	<p>NOTE/ LET WEL: If answer only of $x = 1$: award 1/4 marks <i>Slegs antwoord van $x = 1$: gee 1/4 punte</i></p> <p>If the learner writes $2x - x = 1$ Breakdown: 0/4 marks <i>As die leerder $2x - x = 1$ skryf</i> <i>Ontleding: 0/4 punte</i></p>	<p>✓ std vorm/stand vorm ✓ factors/fakt</p> <p>✓ $x = 1$ ✓ $2^x \neq -1$</p> <p style="text-align: right;">(4)</p>
2.3	$(x + y)^2 = \left(\frac{3 - \sqrt{a}}{\sqrt{2}} + \frac{4 + \sqrt{a}}{\sqrt{2}} \right)^2$ $= \left(\frac{7}{\sqrt{2}} \right)^2$ $= \frac{49}{2}$ $= 24\frac{1}{2}$ <p>OR/OF</p> $(x + y)^2 = x^2 + 2xy + y^2$ $= \left(\frac{3 - \sqrt{a}}{\sqrt{2}} \right)^2 + 2 \left(\frac{3 - \sqrt{a}}{\sqrt{2}} \right) \left(\frac{4 + \sqrt{a}}{\sqrt{2}} \right) + \left(\frac{4 + \sqrt{a}}{\sqrt{2}} \right)^2$ $= \left(\frac{9 - 6\sqrt{a} + a}{2} \right) + 2 \left(\frac{12 - \sqrt{a} - a}{2} \right) + \left(\frac{16 + 8\sqrt{a} + a}{2} \right)$ $= \left(\frac{25 + 2\sqrt{a} + 2a}{2} \right) + (12 - \sqrt{a} - a)$ $= \frac{25}{2} + \sqrt{a} + a + 12 - \sqrt{a} - a$ $= 24\frac{1}{2}$	<p>✓ substitution/verv.</p> <p>✓ simplification/vereenv.</p> <p>✓ answer/antw.</p> <p>✓ substitution/verv.</p> <p>✓ simplification/vereenv.</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(3)</p>	
2.4	$\sqrt[12]{10} \cdot \sqrt[6]{64 \cdot 10} \cdot \sqrt[4]{81 \cdot 10} \cdot \sqrt{4 \cdot 10}$ $= \sqrt[12]{10} \cdot \sqrt[6]{2^6 \cdot 10} \cdot \sqrt[4]{3^4 \cdot 10} \cdot \sqrt{2^2 \cdot 10}$ $= 10^{\frac{1}{12}} \cdot 2^{\frac{6}{6}} \cdot 10^{\frac{1}{6}} \cdot 3^{\frac{4}{4}} \cdot 10^{\frac{1}{4}} \cdot 2^{\frac{2}{2}} \cdot 10^{\frac{1}{2}}$ $= 2 \times 3 \times 2 \times 10^{\frac{12}{12}}$ $= 120$ <p>OR/OF</p>	<p>✓ split the surd/ <i>skei wortel</i> ✓ prime base/ <i>priem basis</i> ✓ rational exponents/ <i>rasionele eksp</i> ✓ $10^{\frac{12}{12}}$</p>	

G hkw

	$= \sqrt[12]{2 \cdot 5} \cdot \sqrt[6]{2^7 \cdot 5} \cdot \sqrt[4]{3^4 \cdot 2 \cdot 5} \cdot \sqrt{2^3 \cdot 5}$ $= 2^{\frac{1}{12}} \cdot 5^{\frac{1}{12}} \cdot 2^{\frac{7}{6}} \cdot 5^{\frac{1}{6}} \cdot 3^{\frac{4}{4}} \cdot 2^{\frac{1}{4}} \cdot 5^{\frac{1}{4}} \cdot 2^{\frac{3}{2}} \cdot 5^{\frac{1}{2}}$ $= 2^{\frac{36}{12}} \times 3^{\frac{4}{4}} \times 5^{\frac{12}{12}}$ $= 2^3 \times 3^1 \times 5^1$ $= 120$	<p>✓ prime base/ <i>priem basis</i></p> <p>✓ rational exponents/ <i>rasionele eksp</i></p> <p>✓ exponent law/ <i>eksp. wet</i></p> <p>✓ simpification/ <i>vereenv</i></p> <p style="text-align: right;">(4)</p> <p style="text-align: right;">[18]</p>
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WCH

QUESTION/VRAAG 3

<p>3.1.1</p>	$ \begin{array}{ccccc} 12 & & 17 & & 22 \\ & \searrow & / & \searrow & / \\ & 5 & & 5 & \\ & / & & / & \\ T_n & = & 5n + 7 & & \end{array} $	<p>✓ $5n$ ✓ $+7$ (2)</p>
<p>3.1.2</p>	$ \begin{aligned} T_{12} &= 5(12) + 7 \\ &= 67 \end{aligned} $	<p>✓ subst/verv ✓ answer/antw (2)</p>
<p>3.1.3</p>	$ \begin{aligned} 5n + 7 &= 172 \\ 5n &= 165 \\ n &= 33 \end{aligned} $	<p>✓ $5n + 7 = 172$ ✓ answer/antw (2)</p>
<p>3.2</p>	$ \begin{array}{ccccccc} 3 & & x & & y & & 30 \\ & \searrow & / & \searrow & / & \searrow & / \\ & x-3 & & y-x & & 30-y & \end{array} $ <p> $x - 3 = y - x$ $y = 2x - 3$ </p> <p> $x - 3 = 30 - y$ $x - 3 = 30 - 2x + 3$ $3x = 36$ $x = 12$ $y = 21$ </p> <p style="text-align: center;">OR/OF</p> <p> $30 - y = y - x$ $30 + x = 2y$ $30 + x = 2(2x - 3)$ $36 = 3x$ $12 = x$ $y = 21$ </p> <p>OR/OF</p> <p> $30 - 3 = 3d$ $3d = 27$ $d = 9$ </p> <p> $x = 3 + 9 = 12$ $y = 12 + 9 = 21$ </p>	<p>✓ $x - 3 = y - x$</p> <p>✓ $30 - y = y - x$</p> <p>✓ equating/verg.</p> <p>✓ both /beide $x = 12$ and/en $y = 21$ (4)</p> <p>✓✓ $30 - 3 = 3d$</p> <p>✓ $d = 9$</p> <p>✓ both /beide $x = 12$ and/en $y = 21$ (4)</p> <p style="text-align: right;">[10]</p>

Handwritten marks: a circled 'G' and 'WCV'

QUESTION/VRAAG 4

<p>4.1</p>	<div style="text-align: center;"> </div> <p>$T_5 = 76$</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NOTE/LET WEL: Calc. differences 1/2 marks bereken verskille: 1/2 punte</p> </div>	<p>✓✓ answer/antw. (2)</p>
<p>4.2</p>	$2a = 6$ $a = 3$ $3a + b = -51$ $3(3) + b = -51$ $b = -60$ $a + b + c = 244$ $3 + -60 + c = 244$ $c = 301$ $T_n = 3n^2 - 60n + 301$	<p>✓ $a = 3$</p> <p>✓ $b = -60$</p> <p>✓ $c = 301$</p> <p>✓ $T_n = 3n^2 - 60n + 301$ (4)</p>
<p>4.3</p>	$3n^2 - 60n + 301 = 508$ $3n^2 - 60n - 207 = 0$ $n^2 - 20n - 69 = 0$ $(n + 3)(n - 23) = 0$ $n = 23 \text{ or } n \neq -3$	<p>✓ equating/verg.</p> <p>✓ std form/stand vorm</p> <p>✓ factors/fakore</p> <p>✓ select/ kies $n = 23$ (4)</p>
<p>4.4</p>	<p>using first diff./ gebruik eerste versk</p> $T_n = 6n - 57$ $453 = 6n - 57$ $510 = 6n$ $n = 85$ <p>between T_{85} and T_{86} in the quadratic pattern tussen T_{85} en T_{86} in die kwadratiese patroon</p> <p>OR/OF In the quadratic pattern / in die kwadratiese patroon $T_{n+1} - T_n = 453$ $3(n+1)^2 - 60(n+1) + 301 - (3n^2 - 60n + 301) = 453$ $3n^2 + 6n + 3 - 60n - 60 - 3n^2 + 60n = 453$ $6n = 510$ $n = 85$ between T_{85} and T_{86} tussen T_{85} en T_{86}</p>	<p>✓ $6n - 57$</p> <p>✓ $453 = 6n - 57$</p> <p>✓ between T_{85} and T_{86} tussen T_{85} en T_{86} (3)</p> <p>✓</p> <p>$3(n+1)^2 - 60(n+1) + 301 - (3n^2 - 60n + 301) = 453$</p> <p>✓ $n = 85$</p> <p>✓ between T_{85} and T_{86} tussen T_{85} en T_{86} (3)</p>

Handwritten marks: a circled '4' and the letters 'WVW'.

<p>4.5</p> $T_n = 3n^2 - 60n + 300 + 1$ $= 3(n-10)^2 + 1$ <p>$(n-10)^2 \geq 0$ for/vir $n \in \mathbb{N}$</p> $3(n-10)^2 \geq 0$ $3(n-10)^2 + 1 > 0$ <p>All terms in the pattern are positive/<i>al die terme in die patroon is positief</i></p> <p>OR/OF</p> $Tn = 3n^2 - 60n + 301$ $= 3(n-10)^2 + 1$ <p>T is a minimum valued function with minimum value 1 Range of T: $y \geq 1$ All terms in the pattern are positive.</p> <p><i>T is funksie met minimum waarde van 1 Waardeversameling van T; $y \geq 1$ al die terme in die patroon is positief</i></p> <p>OR/OF</p> $p = \frac{-b}{2a}$ $= -\frac{(-60)}{6}$ $= 10$ $q = 3(10)^2 - 60(10) + 301$ $= 1$ <p>T is a minimum valued function with minimum value 1 Range of T: $y \geq 1$ All terms in the pattern are positive.</p> <p><i>T is funksie met minimum waarde van 1 Waardeversameling van T; $y \geq 1$ al die terme in die patroon is positief</i></p>	<p>$\checkmark\checkmark T_n = 3(n-10)^2 + 1$</p> <p>$\checkmark\checkmark$ argument (4)</p> <p>$\checkmark\checkmark T_n = 3(n-10)^2 + 1$</p> <p>$\checkmark\checkmark$ argument</p> <p>$\checkmark p = 10$</p> <p>$\checkmark q = 1$</p> <p>$\checkmark\checkmark$ argument (4)</p> <p>[17]</p>
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G WKW

QUESTION/VRAAG 5

5.1	$f(-3) = \frac{-3}{-3+2} + 1$ $= 4$	✓ answer/antw. (1)
5.2	$4 = 2^{-x} - 4$ $8 = 2^{-x}$ $2^3 = 2^{-x}$ $x = -3$	✓ $4 = 2^{-x} - 4$ ✓ answer /antw. (2)
5.3	$x = -2$ $y = 1$	✓ $x = -2$ ✓ $y = 1$ (2)
5.4	$y > -4$ OR/OF $y \in (-4 ; \infty)$	✓ answer/antw. (1) ✓ answer/antw. (1)

5.5	<p><i>y</i>-intercept/<i>afsnit</i>:</p> $y = \frac{-3}{0+2} + 1$ $= \frac{-1}{2}$ <p><i>y</i>-intercept/<i>afsnit</i> is $\left(0; -\frac{1}{2}\right)$</p> <p><i>x</i>-intercept/<i>afsnit</i>:</p> $0 = \frac{-3}{x+2} + 1$ $-1 = \frac{-3}{x+2}$ $-x - 2 = -3$ $-x = -1$ $x = 1$ <p><i>x</i>-intercept/<i>afsnit</i> is $(1; 0)$</p>	<p>✓ subst/<i>verv</i> $x = 0$</p> <p>✓ $y = \frac{-1}{2}$</p> <p>✓ subst/<i>verv</i> $y = 0$</p> <p>✓ simplification/<i>vereenv.</i></p> <p>✓ $x = 1$</p> <p>(5)</p>
5.6	<p>$y = -x + c$</p> <p>$1 = -(-2) + c$</p> <p>$-1 = c$</p> <p>$y = -x - 1$</p> <p>OR/OF</p> <p>$y - 1 = -(x - (-2))$</p> <p>$y = -x - 2 + 1$</p> <p>$y = -x - 1$</p>	<p>✓ subst/<i>verv</i></p> <p>✓ answer/<i>antw.</i></p> <p>(2)</p> <p>✓ subst/<i>verv</i></p> <p>✓ answer/<i>antw.</i></p> <p>(2)</p>

<p>5.7</p>		<p><i>f</i></p> <ul style="list-style-type: none"> ✓ asympt/asimpt ✓ Shape / vorm ✓ <i>x</i> and/en <i>y</i> intercepts / afsnitte <p><i>g</i></p> <ul style="list-style-type: none"> ✓ asymptote/asimpt ✓ <i>x</i>-intercept/afsnit (-2 ; 0) ✓ <i>y</i>-intercept/afsnit (0 ; -3) <p>(6)</p>
<p>5.8</p>	<p>$x \leq -3$ or $-2 < x \leq -1$</p> <p>OR/OF</p> <p>$x \in (-\infty ; -3) \cup (-2 ; -1]$</p>	<ul style="list-style-type: none"> ✓ $x \leq -3$ ✓ $-2 < x \leq -1$ <p>(2)</p> <ul style="list-style-type: none"> ✓ $(-\infty ; -3)$ ✓ $(-2 ; -1]$ <p>(2)</p> <p>[21]</p>

G wkw

QUESTION/VRAAG 6

<p>6.1</p>	$0 = -x^2 - x + 6$ $x^2 + x - 6 = 0$ $(x + 3)(x - 2) = 0$ $x = -3 \text{ or / of } x = 2$ <p>B(-3 ; 0) and C(2 ; 0)</p>	<p>✓ $y = 0$ ✓ standard form/vorm ✓ factors/faktore ✓ both answers/beide antw (4)</p>
<p>6.2</p>	$x = \frac{-b}{2a}$ $x = \frac{-(-1)}{2(-1)}$ $= -\frac{1}{2}$ <p>OR/ OF</p> $x = \frac{x_1 + x_2}{2}$ $= \frac{(-3) + (2)}{2}$ $= -\frac{1}{2}$ <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>NOTE/ LET WEL: If answer only: award 2/2 marks Slegs antwoord : gee 2/2 punte</p> </div>	<p>✓ method/metode ✓ answer/antw. (2)</p> <p>✓ method/metode ✓ answer/antw (2)</p>
<p>6.3</p>	$f\left(-\frac{1}{2}\right)$ $= -\left(-\frac{1}{2}\right)^2 - \left(-\frac{1}{2}\right) + 6$ $= 6\frac{1}{4}$ <p>TP/DP $\left(-\frac{1}{2}; 6\frac{1}{4}\right)$</p> <p>Range/waardeversameling $y \in \left(-\infty ; 6\frac{1}{4}\right]$</p> <p>OR/OF $y \leq 6\frac{1}{4}$</p>	<p>✓ Subst ✓ $6\frac{1}{4}$ ✓ Answer/antw. (3)</p>
<p>6.4</p>	<p>D(0 ; 6)</p> $m_{AD} = \frac{6 - 4}{0 - (-2)}$ $= 1$ <p>Equation of/vergelyking van g: $g(x) = x + 6$</p>	<p>✓ coordinates/koördinate D ✓ gradient. ✓ answer/antw (3)</p>

G W W

6.5	Average/Gemid. gradient = gradient of/van g = 1	✓ answer/antw. (1)
6.6	$f(x) = -\left(x + \frac{1}{2}\right)^2 + \frac{25}{4}$ $h(x) = \left(x + \frac{1}{2} - 3\right)^2 - \frac{25}{4}$ $h(x) = \left(x - \frac{5}{2}\right)^2 - \frac{25}{4}$ <p>OR/OF</p> $f(x) = -x^2 - x + 6$ $h(x) = (x - 3)^2 + (x - 3) - 6$ $h(x) = x^2 - 5x$ $h(x) = \left(x - \frac{5}{2}\right)^2 - \frac{25}{4}$	✓ in the form/ in die vorm $f(x) = -\left(x + \frac{1}{2}\right)^2 + \frac{25}{4}$ ✓ $\left(x - \frac{5}{2}\right)^2$ ✓ $-\frac{25}{4}$ (3) ✓ $h(x) = (x - 3)^2 + (x - 3) - 6$ ✓ $\left(x - \frac{5}{2}\right)^2$ ✓ $-\frac{25}{4}$ (3)
6.7	$-3 < x < 2$ <p>OR/OF</p> $x \in (-3 ; 2)$	✓ ✓ answer/antw. (2) ✓ ✓ answer/antw. (2)
6.8	$r = -2$ By symmetry/deur simmetrie $p = 1$ $p - r = 3$ <p>OR/OF</p> $-x^2 - x + 6 = 4$ $-x^2 - x + 2 = 0$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1) = 0$ $x = -2$ or / of $x = 1$ $r = -2$ $p = 1$ $p - r = 3$	✓ $r = -2$ ✓ ✓ $p = 1$ ✓ answer/antw. (4) ✓ $r = -2$ ✓ ✓ $p = 1$ ✓ answer/antw. (4) [22]

QUESTION/VRAAG 7

7.1	$A = P(1-i)^n$ $20000 = 80000(1-i)^5$ $0,25 = (1-i)^5$ $\sqrt[5]{0,25} = 1-i$ $i = 1 - \sqrt[5]{0,25}$ $i = 0,24214417$ $i = 24,21\%$	<p>✓ substitution into correct formula/ <i>verv. in korrekte vorm</i></p> <p>✓ simplification/<i>vereenv</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3)</p>
7.2	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m$ $1 + i_{eff} = \left(1 + \frac{0,05}{4}\right)^4$ $i_{eff} = 0,050945336...$ <p>Effective rate = 5,09 % p.a.</p>	<p>✓ vorm/<i>vorm</i></p> <p>✓ subst/<i>verv</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3)</p>
7.3	$A = P(1+i)^n$ $= 30000 \left(1 + \frac{0,12}{12}\right)^{2 \times 12} \left(1 + \frac{0,108}{2}\right)^{4 \times 2}$ $= R 58 017,51$ <p>OR/ OF</p> $A = P(1+i)^n$ $= 30000 \left(1 + \frac{0,12}{12}\right)^{2 \times 12}$ $= R 38092,04$ $A = 38092,04 \left(1 + \frac{0,108}{2}\right)^{4 \times 2}$ $= R 58 017,51$	<p>✓ $30000 \left(1 + \frac{0,12}{12}\right)^{2 \times 12}$</p> <p>✓ $\left(1 + \frac{0,12}{12}\right)^{2 \times 12}$</p> <p>✓ $\left(1 + \frac{0,108}{2}\right)^{4 \times 2}$</p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(4)</p> <p>✓ $30000 \left(1 + \frac{0,12}{12}\right)^{2 \times 12}$</p> <p>✓ R 38092,04</p> <p>✓ $38092,04 \left(1 + \frac{0,108}{2}\right)^{4 \times 2}$</p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(4)</p>

<p>7.4</p>	$A = 25000\left(1 + \frac{0,18}{12}\right)^{5 \times 12} - 8000\left(1 + \frac{0,18}{12}\right)^{3 \times 12} + 4000\left(1 + \frac{0,18}{12}\right)^{1,5 \times 12}$ $= 25000\left(1 + \frac{0,18}{12}\right)^{60} - 8000\left(1 + \frac{0,18}{12}\right)^{36} + 4000\left(1 + \frac{0,18}{12}\right)^{18}$ $= R 52636,74$ <p>OR/OF</p>	<p>✓ $\frac{0,18}{12}$</p> <p>✓ $25000\left(1 + \frac{0,18}{12}\right)^{5 \times 12}$</p> <p>✓ $- 8000\left(1 + \frac{0,18}{12}\right)^{3 \times 12}$</p> <p>✓ $+ 4000\left(1 + \frac{0,18}{12}\right)^{18}$</p> <p>✓✓ answer/antw.</p>
	$A_1 = 25000\left(1 + \frac{0,18}{12}\right)^{2 \times 12}$ $= R 35 737,57$ <p>Amount in the account after the withdrawal:/<i>Bedrag in rekening na onttrekking</i></p> $R 35 737,5703 - R 8000$ $= R 27737,5703$ <p>Amount in the account just before the deposit/<i>bedrag in rekening voor die deposito</i></p> $A_2 = R 27737,5703\left(1 + \frac{0,18}{12}\right)^{1,5 \times 12}$ $= R 36262,45279$ <p>Amount in the account just after the deposit/<i>Bedrag in rekening na onttrekking</i></p> $R 36262,45279 + R 4000$ $= R 40262,45279$ <p>Amount in the account at the end of 5 years/<i>Bedrag in rekening aan die einde van 5 jaar</i></p> $= 40262,45279\left(1 + \frac{0,18}{12}\right)^{1,5 \times 12}$ $= R 52636,74$	<p>✓ $\frac{0,18}{12}$</p> <p>✓ $25000\left(1 + \frac{0,18}{12}\right)^{2 \times 12}$</p> <p>✓ 27737,57</p> <p>✓ $27737,5703\left(1 + \frac{0,18}{12}\right)^{1,5 \times 12}$</p> <p>✓ 40262,45</p> <p>✓ answer/antw.</p> <p style="text-align: right;">(6) [16]</p>

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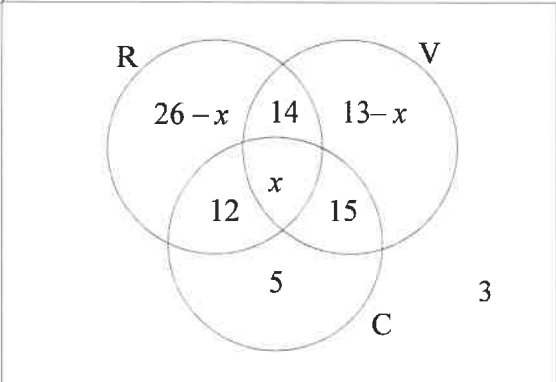
QUESTION/VRAAG 8

<p>8.1.1</p>	<p style="text-align: right;">(3)</p>	<p>✓ branches/<i>takke</i></p> <p>✓ probabilities/<i>waarskynlikhede</i></p> <p>✓ outcomes/<i>uitkomst</i></p> <p style="text-align: right;">(3)</p>
<p>8.1.2</p>	$P(R, B) = \frac{2}{5} \times \frac{3}{4}$ $= \frac{3}{10} = 0,3$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NOTE/ LET WEL: If answer only: award 2/2 marks <i>Slegs antwoord : gee 2/2 punte</i></p> </div>	<p>✓ $\frac{2}{5} \times \frac{3}{4}$</p> <p>✓ answer/<i>antwoord</i></p> <p style="text-align: right;">(2)</p>
<p>8.2.1</p>	<p>$P(A) = 0,4$</p> <p>$P(B) = 0,3$</p> <p>$P(A \text{ or } B) = 0,58$</p> <p>$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$</p> <p>$0,58 = 0,4 + 0,3 - P(A \text{ and } B)$</p> <p>$P(A \text{ and } B) = 0,12 \neq 0$</p> <p>Events A and B are not mutually exclusive/<i>Gebeurtenis A en B is nie onderlinguitsluitend nie</i></p>	<p>✓ $0,58 = 0,4 + 0,3 - P(A \text{ and } B)$</p> <p>✓ $P(A \text{ and } B) = 0,12 \neq 0$</p> <p>✓ Not mutually exclusive/<i>nie onderling uitsluitend nie</i></p> <p style="text-align: right;">(3)</p>
<p>8.2.2</p>	<p>$P(A \text{ and } B) = 0,12$</p> <p>$P(A) \times P(B) = 0,4 \times 0,3$</p> <p>$= 0,12$</p> <p>$\therefore P(A \text{ and } B) = P(A) \times P(B)$</p> <p>A and B are independent events/<i>is onafhanklik</i></p>	<p>✓ $P(A) \times P(B) = 0,4 \times 0,3$</p> <p>✓ $P(A \text{ and } B) = P(A) \times P(B)$</p> <p>✓ A and B are independent/<i>is onafhanklik</i></p> <p style="text-align: right;">(3)</p>

[11]

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QUESTION/VRAAG 9

<p>9.1</p>	<p>$n(S) = 80$</p> 	<p>✓ 14 or/of 12 or/of 15 ✓ $26 - x$ ✓ $13 - x$ ✓ 5 ✓ 3</p> <p>(5)</p>
<p>9.2</p>	<p>$26 - x + 14 + x + 12 + 5 + 15 + 13 - x + 3 = 80$ $88 - 80 = x$ $x = 8$</p>	<p>✓ $26 - x + 14 + x + 12 + 5 + 15 + 13 - x + 3$ ✓ equating to/gelyk aan 80</p> <p>(2)</p>
<p>9.3</p>	<p>Number who chose Rugby only/aantal wat net rugby kies $= 26 - 8$ $= 18$</p>	<p>✓ answer/antw.</p> <p>(1)</p>
<p>9.4</p>	<p>$P(\text{At least 2 types of sports /ten minste 2 sportsoorte})$ $= \frac{12+14+15+8}{80}$ $= \frac{49}{80}$</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NOTE/ LET WEL: If answer only: award 3/3 marks Slegs antwoord : gee 3/3 punte</p> </div> <p>OR/OF</p> <p>$P(\text{at least 2 types of sport/ten minste 2 sportsoorte})$ $= 1 - \frac{18+5+5+3}{80}$ $= 1 - \frac{31}{80}$ $= \frac{49}{80}$</p>	<p>✓ numerator/Noemer ✓ denominator/Teller ✓ answer/antw.</p> <p>✓ $\frac{18+5+5+3}{80}$ ✓ method/metode</p> <p>✓ answer/antw.</p> <p>(3)</p> <p>[11]</p>

TOTAL/TOTAAL: 150