



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/*GRAAD* 11**

**MATHEMATICS P1/*WISKUNDE V1***

**NOVEMBER 2019**

**MARKING GUIDELINES/*NASIENRIGLYNE***

**MARKS/*PUNTE*: 150**

**These marking guidelines consist of 17 pages./  
*Hierdie nasienriglyne bestaan uit 17 bladsye.***

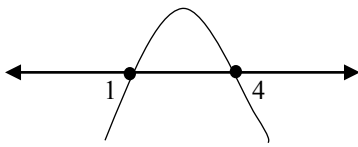
**NOTE:**

- 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/answer 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 | $2x(x-3)=0$<br>$2x=0$ or/of $x=3$<br>$x=0$   | ✓ $x=0$<br>✓ $x=3$<br>(2)   |
| 1.1.2 | $3x^2 - 2x = 4$<br>$3x^2 - 2x - 4 = 0$<br>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-4)}}{2(3)}$ $x = 1,54$ or $x = -0,87$ | ✓ standard form/standaardvorm<br>✓ substitution into correct formula/<br>vervanging in korrekte formule<br>✓ answer/antw.<br>✓ answer/antw.<br>(4)  |
| 1.1.3 | $(x-1)(4-x) \geq 0$<br><br>$1 \leq x \leq 4$                                  | ✓ critical values/kritieke waardes<br>✓✓ $1 \leq x \leq 4$<br>(3)   |
| 1.1.4 | $\sqrt{5-x} = x+1$<br>$5-x = (x+1)^2$<br>$5-x = x^2 + 2x + 1$<br>$x^2 + 3x - 4 = 0$<br>$(x+4)(x-1) = 0$<br>$x \neq -4$ or $x = 1$                                | ✓ squaring both sides/<br>kwadreer beide kante<br>✓ standard form/standaardvorm<br>✓ factors or using formula/<br>faktore of gebruik formule<br>✓ both solutions to/<br>beide oplossings $x$<br>✓ rejecting/verwerp $x = -4$<br>(5) |

|            |   |   |
|------------|---|---|
| <p>1.2</p> | $x + 4 = 2y \quad \text{and} \quad y^2 - xy + 21 = 0$ $\therefore x = 2y - 4$ $y^2 - (2y - 4)y + 21 = 0$ $y^2 - 2y^2 + 4y + 21 = 0$ $-y^2 + 4y + 21 = 0$ $y^2 - 4y - 21 = 0$ $(y - 7)(y + 3) = 0$ $y = 7 \text{ or } y = -3$ $x = 2(7) - 4 \quad \text{or} \quad x = 2(-3) - 4$ $x = 10 \quad \text{or} \quad x = -10$  | <p>✓ <math>x = 2y - 4</math><br/>                 ✓ substitution / <i>verv.</i><br/><br/>                 ✓ std form / <i>stand. vorm</i><br/><br/>                 ✓ factors or using formula / <i>faktore of gebruik formule</i><br/>                 ✓ y-values / <i>wrdes</i><br/><br/>                 ✓ x-values / <i>wrdes</i></p> <p style="text-align: right;">(6)</p>   |
| <p>1.3</p> | $2(x - 3)^2 + 2 = 0$ $(x - 3)^2 = -1$ <p>∴ roots are non - real / <i>wortels is niereël</i></p>   | <p>✓ <math>(x - 3)^2 = -1</math><br/>                 ✓ conclusion / <i>gevolgtrekking</i></p> <p style="text-align: right;">(2)</p>  |
| <p>1.4</p> | $g(x) = -2x^2 - px + 3$ $x = \frac{-b}{2a} = \frac{-(-p)}{2(-2)} = -\frac{p}{4}$ $y = -2\left(-\frac{p}{4}\right)^2 - p\left(-\frac{p}{4}\right) + 3$ $-2\left(-\frac{p}{4}\right)^2 - p\left(-\frac{p}{4}\right) + 3 = 3\frac{1}{8}$ $-\frac{p^2}{8} + \frac{2p^2}{8} = \frac{1}{8}$ $p^2 = 1$ $p = \pm 1$ <p style="text-align: center;"><b>OR/OF</b></p> $\text{max value/maks waarde} = \frac{4ac - b^2}{4a}$ $\frac{4(-2)(3) - p^2}{4(-2)} = \frac{25}{8}$ $\frac{-24 - p^2}{-8} = \frac{25}{8}$ $-192 - 8p^2 = -200$ $8p^2 = 8$ $p = \pm 1$ | <p>✓ <math>x = -\frac{p}{4}</math><br/><br/>                 ✓ <math>-2\left(-\frac{p}{4}\right)^2 - p\left(-\frac{p}{4}\right) + 3 = 3\frac{1}{8}</math><br/><br/>                 ✓ simplification / <i>vereenvoudiging</i><br/><br/>                 ✓ <math>p = \pm 1</math><br/><br/>                 ✓ max value = <math>\frac{4ac - b^2}{4a}</math><br/>                 ✓ <math>\frac{4(-2)(3) - p^2}{4(-2)} = \frac{25}{8}</math><br/><br/>                 ✓ simplification<br/><br/>                 ✓ <math>p = \pm 1</math></p> <p style="text-align: right;">(4)<br/> <b>[26]</b></p> |

**QUESTION/VRAAG 2**

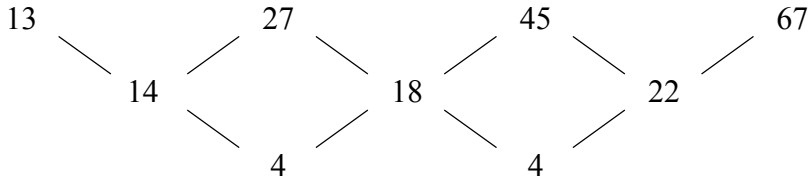
|       |  |  |
|-------|--|--|
| 2.1   | $\frac{3^{2x+1} \cdot 15^{2x-3}}{27^{x-1} \cdot 3^x \cdot 5^{2x-4}}$ $= \frac{3^{2x+1} \cdot 3^{2x-3} \cdot 5^{2x-3}}{3^{3x-3} \cdot 3^x \cdot 5^{2x-4}}$ $= 3^{2x+1+2x-3-3x+3-x} \cdot 5^{2x-3-2x+4}$ $= 3.5$ $= 15$  | <ul style="list-style-type: none"> <li>✓ prime bases/<i>priembasis</i></li> <li>✓ base/<i>basis</i> 3</li> <li>✓ adding and subtracting exponents/<i>optel en aftrek van eksponente</i></li> <li>✓ answer/<i>antw.</i></li> </ul> <p style="text-align: right;">(4)</p>  |
| 2.2.1 | $\left(\frac{1}{2}\right)^x = 32$ $\left(\frac{1}{2}\right)^x = 2^5$ $2^{-x} = 2^5$ $-x = 5$ $x = -5$ <p><b>OR/OF</b></p> $\left(\frac{1}{2}\right)^x = 32$ $\left(\frac{1}{2}\right)^x = 2^5$ $\left(\frac{1}{2}\right)^x = \left(\frac{1}{2}\right)^{-5}$ $x = -5$ | <ul style="list-style-type: none"> <li>✓ same base/<i>dieselfde basis</i></li> <li>✓ equating indices/<i>gelykstelling van eksponente</i></li> <li>✓ answer/<i>antw.</i></li> </ul> <p><b>OR/OF</b></p> <ul style="list-style-type: none"> <li>✓ same base/<i>dieselfde basis</i></li> <li>✓ simplification/<i>vereenv</i></li> <li>✓ answer/<i>antw.</i></li> </ul> <p style="text-align: right;">(3)</p> |
| 2.2.2 | $\sqrt[3]{\frac{1}{x^2}} = 4$ $x^{\frac{-2}{3}} = 2^2$ $x = (2^2)^{-\frac{3}{2}}$ $x = 2^{-3}$ $x = \frac{1}{8}$   | <ul style="list-style-type: none"> <li>✓ exp form/<i>eksp. vorm</i></li> <li>✓ <math>x = (2^2)^{-\frac{3}{2}}</math></li> <li>✓ answer/<i>antw.</i></li> </ul> <p style="text-align: right;">(3)</p>   |

|              |   |  |
|--------------|---|--|
| <p>2.2.3</p> | $2^x - \frac{12}{2^x} = -4$ $(2^x)^2 - 12 = -4 \cdot 2^x$ $(2^x)^2 + 4 \cdot 2^x - 12 = 0$ $(2^x + 6)(2^x - 2) = 0$ $2^x \neq -6 \quad \text{or} \quad 2^x = 2$ <p>no solution/<i>geen oplossing</i> or/of <math>x = 1</math></p> <p><b>OR/OF</b></p> <p>Let <math>2^x = k</math></p> $k - \frac{12}{k} = -4$ $k^2 - 12 = -4k$ $k^2 + 4k - 12 = 0$ $(k - 2)(k + 6) = 0$ $k = 2 \quad \text{or} \quad k = -6$ $2^x = 2 \quad \text{or} \quad 2^x \neq -6$ $x = 1 \quad \text{or} \quad \text{no solution}$ | <ul style="list-style-type: none"> <li>✓ mult by LCD/KGN</li> <li>✓ <math>(2^x)^2 + 4 \cdot 2^x - 12 = 0</math></li> <li>✓ factors/<i>faktore</i></li> <li>✓ <math>2^x \neq -6</math></li> <li>✓ <math>x = 1</math></li> </ul> <p style="text-align: right;">(5)</p> <p><b>OR/OF</b></p> <ul style="list-style-type: none"> <li>✓ mult by LCD/KGN</li> <li>✓ <math>k^2 + 4k - 12 = 0</math></li> <li>✓ factors/<i>faktore</i></li> <li>✓ <math>2^x \neq -6</math></li> <li>✓ <math>x = 1</math></li> </ul> <p style="text-align: right;">(5)</p> |
| <p>2.3</p>   | $\frac{\sqrt{2}}{\sqrt{2} + 1} + \frac{4}{\sqrt{2}}$ $= \frac{\sqrt{2} \cdot \sqrt{2}}{\sqrt{2}(\sqrt{2} + 1)} + \frac{4(\sqrt{2} + 1)}{\sqrt{2}(\sqrt{2} + 1)}$ $= \frac{(\sqrt{2})^2 + 4\sqrt{2} + 2^2}{2 + \sqrt{2}}$ $= \frac{(\sqrt{2} + 2)^2}{2 + \sqrt{2}}$ $= 2 + \sqrt{2}$   | <ul style="list-style-type: none"> <li>✓ LCD/KGN</li> <li>✓ perfect square trinomial<br/><i>volkome vierkant drieterm</i></li> <li>✓ simplification denominator/<br/><i>vereenvoudigingsnoemer</i></li> <li>✓ factors/<i>faktore</i></li> <li>✓ answer/<i>antwoord</i></li> </ul> <p style="text-align: right;">(5)<br/>[22]</p>   |

**QUESTION/VRAAG 3**

|     |   |  |
|-----|---|--|
| 3.1 | $  \begin{array}{ccccccc}  & -5 & & 0 & & 5 & \\  & \diagdown & & / & \diagdown & / & \\  & & 5 & & 5 & &   \end{array}  $ $  \begin{aligned}  T_n &= an + b \\  &= 5n - 10  \end{aligned}  $ | $  \begin{aligned}  &\checkmark 5n \\  &\checkmark -10 \\  & \qquad \qquad \qquad (2)  \end{aligned}  $  |
| 3.2 | $  \begin{aligned}  T_{12} &= 5(12) - 10 \\  &= 50  \end{aligned}  $  | $  \begin{aligned}  &\checkmark \text{substitution/verv.} \\  &\checkmark \text{answer/antw.} \\  & \qquad \qquad \qquad (2)  \end{aligned}  $                       |
| 3.3 | $  \begin{aligned}  5n - 10 &= 130 \\  5n &= 140 \\  n &= 28 \\  &28^{\text{th}} \text{ term}(T_{28})  \end{aligned}  $   | $  \begin{aligned}  &\checkmark \text{substitution/verv.} \\  & \qquad \qquad \qquad \checkmark \text{answer/antw.} \\  & \qquad \qquad \qquad (2)  \end{aligned}  $ |
|     |   | <b>[6]</b>   |

**QUESTION/VRAAG 4**

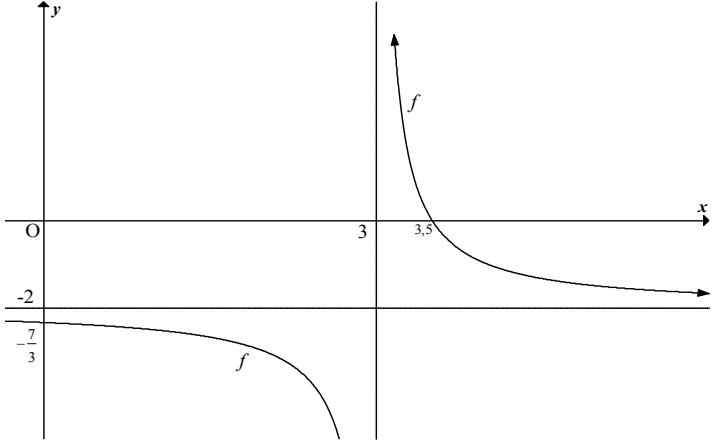
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| <p>4.1.1</p> |  <p>It is a quadratic number pattern/ <i>Dit is 'n kwadratiese getalpatrron</i><br/>         Second difference is constant./<i>Tweede verskil is konstant.</i></p> | <p>✓quadratic/ <i>kwadratiese</i><br/>                 ✓justification/<br/> <i>regverdiging</i></p> <p>(2)</p>   |
| <p>4.1.2</p> | <p><math>2a = 4</math><br/> <math>a = 2</math><br/> <math>3(2) + b = 14</math><br/> <math>b = 8</math><br/> <math>2 + 8 + c = 13</math><br/> <math>c = 3</math><br/> <math>T_n = 2n^2 + 8n + 3</math></p>  | <p>✓ <math>a = 2</math><br/>                 ✓ <math>b = 8</math><br/>                 ✓ <math>c = 3</math><br/>                 ✓ <math>T_n = 2n^2 + 8n + 3</math></p> <p>(4)</p>             |
| <p>4.1.3</p> | <p><math>T_n = 2n^2 + 8n + 3</math><br/> <math>T_{100} = 2(100)^2 + 8(100) + 3</math><br/> <math>= 20803</math></p>  | <p>✓ substitution/<i>vervanging</i><br/>                 ✓ answer/<i>antwoord</i></p> <p>(2)</p>   |
| <p>4.1.4</p> | <p><math>4n + 10 = 110</math><br/> <math>4n = 100</math><br/> <math>n = 25</math><br/> <math>T_{25} = 2(25)^2 + 8(25) + 3</math><br/> <math>= 1453</math><br/> <math>T_{26} = 2(26)^2 + 8(26) + 3</math><br/> <math>= 1563</math></p>                | <p>✓✓ <math>4n + 10 = 110</math><br/>                 ✓ <math>n = 25</math><br/>                 ✓ <math>T_{25} = 1453</math><br/>                 ✓ <math>T_{26} = 1563</math></p> <p>(5)</p> |

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| <p>4.1.5</p> | <p>The first and second differences are all even but the first term is odd./<br/> <i>Die eerste en tweede verskil is gelyk maar die eerste term is onewe.</i><br/>                 Thus when adding an even to an odd number the answer will always be odd./<i>Wanneer 'n ewe by 'n onewe getal gevoeg word, sal die antwoord altyd onewe wees.</i></p> <p><b>OR/OF</b></p> $T_n = 2n^2 + 8n + 3$ <p><math>2n^2</math> has an even coefficient thus it even<br/> <math>8n</math> has an even coefficient thus it even<br/> <math>3</math> is an odd number<br/> <math>\therefore</math> the values will always be odd</p> <p><b>OR/OF</b></p> $T_n = 2n^2 + 8n + 3$ $= 2(n^2 + 4n) + 3$ <p>For all <math>n \in \mathbb{N}</math>,<br/> <math>2(n^2 + 4n)</math> is even/<i>ewe</i><br/> <math>\therefore 2(n^2 + 4n) + 3</math> is odd/<i>onewe</i><br/>                 because an even + odd will always be odd/<i>want 'n ewe en 'n onewe sal altyd 'n onewe maak</i></p> | <p>✓ argument<br/>                 ✓ conclusion/<i>gevolgtr</i></p> <p><b>OR/OF</b></p> <p>✓ argument<br/>                 ✓ conclusion/<i>gevolgtr</i></p> <p><b>OR/OF</b></p> <p>✓ <math>2(n^2 + 4n) + 3</math></p> <p>✓ conclusion/<i>gevolgtr</i> (2)</p> |
| <p>4.2</p>   | <p>1<sup>st</sup> difference/<i>1<sup>ste</sup> verskil</i>:<br/> <math>2p - 4; p - 3; \frac{p}{2} - 1</math><br/>                 2<sup>nd</sup> difference/<i>2<sup>de</sup> verskil</i>:<br/> <math>p - 3 - (2p - 4) = \frac{p}{2} - 1 - (p - 3)</math></p> $-p + 1 = -\frac{p}{2} + 2$ $-\frac{p}{2} = 1$ $p = -2$ <div style="text-align: center;"> </div> <p><math>2(-2) - 4; -2 - 3; \frac{-2}{2} - 1</math><br/> <math>-8; -5; -2</math><br/> <math>x = -4</math> and <math>y = -9</math></p>  | <p>✓</p> $p - 3 - (2p - 4) = \frac{p}{2} - 1 - (p - 3)$ <p>✓ <math>p = -2</math></p> <p>✓ <math>2(-2) - 4 = -8</math></p> <p>✓ <math>y = -9</math><br/>                 ✓ <math>x = -4</math></p> <p>(5)<br/> <b>[20]</b></p>                                 |



**QUESTION/VRAAG 5**

|     |  |  |
|-----|--|--|
| 5.1 | $f(x) = \frac{1}{x-3} - \frac{2x+6}{x+3}$ $= \frac{1}{x-3} - \frac{2(x+3)}{x+3}$ $= \frac{1}{x-3} - 2$ | ✓ common factor<br><i>gemene faktor</i><br>✓ simplification/vereenv.<br>(2)          |
| 5.2 | $x = 3$<br>$y = -2$  | ✓ $x = 3$<br>✓ $y = -2$<br>(2)   |
| 5.3 | $0 = \frac{1}{x-3} - 2$ $2 = \frac{1}{x-3}$ $2(x-3) = 1$ $2x - 6 = 1$ $x = \frac{7}{2}$                | ✓ subst./verv. $y = 0$<br><br>✓ simplification/vereenv.<br><br>✓ answer/antw.<br>(3) |
| 5.4 | $y = \frac{1}{0-3} - 2$ $= \frac{-7}{3}$ <p><b>OR/OF</b></p> $\left(0; \frac{-7}{3}\right)$            | ✓ subst/verv. $x = 0$<br><br>✓ answer/antw.<br><br>✓✓ answer/antw<br>(2)             |

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| <p>5.5</p> |   | <ul style="list-style-type: none"> <li>✓ asymptotes/asimptote</li> <li>✓ shape/vorm</li> <li>✓ x- and y- int.</li> </ul> <p style="text-align: right;">(3)</p>                                       |
| <p>5.6</p> | $y = x + c$ $-2 = 3 + c$ $c = -5$ $y = x - 5$  | <ul style="list-style-type: none"> <li>✓ <math>m = 1</math></li> <li>✓ substitution of/<i>vervanging van</i> (3; -2)</li> <li>✓ <math>c = -5</math></li> </ul> <p style="text-align: right;">(3)</p> |
| <p>5.7</p> | <p>Translate <math>f</math> 3 units to the left and 2 units up.<br/> <i>Transleer <math>f</math> 3 eenhede na links en 2 eenhede op.</i></p> | <ul style="list-style-type: none"> <li>✓ 3 units to the left<br/><i>eenhede na links</i></li> <li>2 units up/<i>eenhede op</i></li> </ul> <p style="text-align: right;">(2)</p>                      |
| <p>5.8</p> | $x \in (-\infty; +\infty); x \neq 0$ <p><b>OR/OF</b></p> $x \in R; x \neq 0$   | <ul style="list-style-type: none"> <li>✓ <math>x \in (-\infty; +\infty)</math></li> <li>✓ <math>x \neq 0</math></li> </ul> <p style="text-align: right;">(2)<br/>[19]</p>                            |



|            |  |  |
|------------|--|--|
| <p>6.5</p> | <p><b>D(1 ;16)</b><br/> <b>E(1;12)</b><br/> <b>DE = 4units</b></p>   | <p>✓ E(1;12)<br/>                 ✓ answer/antwoord</p> <p style="text-align: right;">(2)</p>  |
| <p>6.6</p> | <p><math>h(x) = f(x-1) - 2</math><br/> <math>= -(x-1)^2 + 2(x-1) + 15 - 2</math><br/> <math>= -x^2 + 2x - 1 + 2x - 2 + 15 - 2</math><br/> <math>= -x^2 + 4x + 10</math><br/> <math>= -(x^2 - 4x - 10)</math><br/> <math>= -(x^2 + -4x + 4 - 4 - 10)</math><br/> <math>= -(x-2)^2 + 14</math></p> <p><b>OR/OF</b><br/>                 D(1;16) and <math>a = -1</math><br/> <math>f(x) = -(x-1)^2 + 16</math></p> <p><math>h(x) = f(x-1) - 2</math><br/> <math>= -(x-1-1)^2 + 16 - 2</math><br/> <math>= -(x-2)^2 + 14</math></p> | <p>✓ <math>-(x-1)^2 + 2(x-1) + 15 - 2</math><br/>                 ✓ <math>-x^2 + 4x + 10</math><br/>                 ✓ <math>-(x^2 + -4x + 4 - 4 - 10)</math><br/>                 ✓ <math>h(x) = -(x-2)^2 + 14</math></p> <p><b>OR/OF</b><br/>                 ✓ subst./vervang D(1;16) and <math>a = -1</math><br/>                 ✓ correct form/korrekte vorm</p> <p>✓ <math>h(x) = -(x-1-1)^2 + 16 - 2</math><br/>                 ✓ <math>h(x) = -(x-2)^2 + 14</math></p> <p style="text-align: right;">(4)</p> |
| <p>6.7</p> | <p>max value of/maks wrde van <math>f(x)</math> is 16<br/> <math>\therefore</math> max value of/maks wrde van <math>f(x) - 12</math> is <math>16 - 12 = 4</math><br/>                 max/maks <math>p(x) = 3^4</math><br/> <math>= 81</math></p>  | <p>✓ max value of <math>f(x)</math> is 16<br/>                 ✓ max value of <math>f(x) - 12</math> is <math>16 - 12 = 4</math></p> <p>✓ answer/antw.</p> <p style="text-align: right;">(3)</p>   |
| <p>6.8</p> | <p><math>x \in R ; x \neq 1</math></p>   | <p>✓✓ answer/antwoord</p> <p style="text-align: right;">(2)<br/> <b>[19]</b></p>   |

**QUESTION/VRAAG 7**

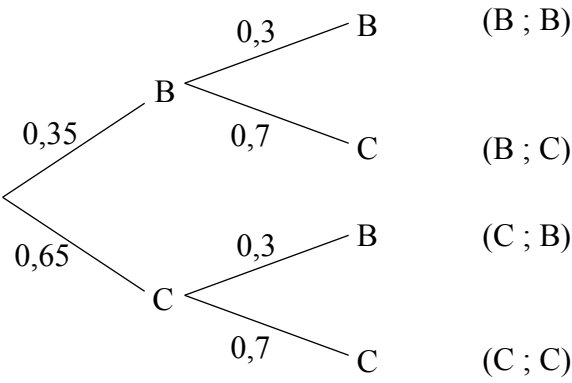
|     |   |   |
|-----|---|---|
| 7.1 | $y = 3^{x+p} - 27$ $54 = 3^{3+p} - 27$ $81 = 3^{3+p}$ $3^4 = 3^{3+p}$ $3 + p = 4$ $p = 1$                                 | <p>\</p> <p>✓ subs/vervanging (3 ; 54)</p> <p>✓ equating indices/gelykst. eksp.</p> <p>✓ answer/antwoord</p> <p>(3)</p> |
| 7.2 | <p>range / waardeversameling <math>y &gt; -27</math></p> <p>or / of</p> $y \in (-27; \infty)$                             | <p>✓✓ answer/antwoord</p> <p>(2)</p>  |
| 7.3 | $-y = 3^{x+1} - 27$ $g(x) = -1.3^{x+1} + 27$ $y = -1.3^{0+1} + 27$ $= 24$ <p><math>y</math> – intercept/afsnit(0; 24)</p> | <p>✓ new equation/nuwe verg.</p> <p>✓ answer/antwoord</p> <p>(2)</p> <p><b>7</b></p>                                    |

**QUESTION/VRAAG 8**

|       |  |   |
|-------|--|---|
| 8.1   | $A = P(1-i)^n$ $85\,000 = 200\,000(1-i)^5$ $i = 1 - \sqrt[5]{\frac{85\,000}{200\,000}}$ $i = 15,73\%$  | <p>✓ substitution/<i>verv.</i></p> <p>✓ rewrite in terms of <i>i</i>/<br/><i>skryf in terme van i</i></p> <p>✓ answer/<i>antw.</i></p> <p>(3)</p>   |
| 8.2   | $1 + i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m$ $1 + i_{eff} = \left(1 + \frac{0,085}{4}\right)^4$ $i_{eff} = \left(1 + \frac{0,085}{4}\right)^4 - 1$ $i_{eff} = 8,77\%$  | <p>✓ formula/<i>form.</i></p> <p>✓ <math>i = \frac{0,085}{4}</math></p> <p>✓ answer/<i>antw.</i></p> <p>(3)</p>   |
| 8.3.1 | $A = P(1+i)^n$ $= 28\,000\left(1 + \frac{0,12}{12}\right)^{2 \times 12}$ $= R\,35\,552,57$   | <p>✓ substitution/<i>verv.</i></p> <p>✓ answer/<i>antw.</i></p> <p>(2)</p>  |
| 8.3.2 | $A = 28\,000\left(1 + \frac{0,12}{12}\right)^{12 \times 4} \left(1 + \frac{0,129}{2}\right)^{2 \times 4} +$ $12\,000\left(1 + \frac{0,12}{12}\right)^{12} \left(1 + \frac{0,129}{2}\right)^{2 \times 4} - 6500\left(1 + \frac{0,129}{2}\right)^{2 \times 3}$ $= R\,87\,267,25$ <p><b>OR/OF</b></p> | <p>✓ <math>\frac{0,12}{12}</math> and <math>n = 48</math></p> <p>✓ <math>\frac{0,129}{2}</math> and <math>n = 8</math></p> <p>✓</p> $12\,000\left(1 + \frac{0,12}{12}\right)^{12} \left(1 + \frac{0,129}{2}\right)^{2 \times 4}$ <p>✓ <math>-6500\left(1 + \frac{0,129}{2}\right)^{2 \times 3}</math></p> <p>✓ answer/<i>antw.</i></p> <p>(5)</p> |

|  |  |   |
|--|--|---|
|  | $A = \left\{ \left\{ 28\,000 \left( 1 + \frac{0,12}{12} \right)^{12 \times 3} + 12\,000 \right\} \right.$ $\left. \left( 1 + \frac{0,12}{12} \right)^{12} \left( 1 + \frac{0,129}{2} \right)^2 - 6500 \right\} \left( 1 + \frac{0,129}{2} \right)^6$ $= R87\,267,25$ | <p>✓✓</p> $28\,000 \left( 1 + \frac{0,12}{12} \right)^{12 \times 3} + 12\,000$ <p>✓</p> $\left( 1 + \frac{0,12}{12} \right)^{12} \left( 1 + \frac{0,129}{2} \right)^2 - 6500$ <p>✓ <math>\left( 1 + \frac{0,129}{2} \right)^6</math></p> <p>✓ answer/antw.</p> <p>(5)</p> |
|  |  | <b>[13]</b>   |

**QUESTION/VRAAG 9**

|              |   |  |
|--------------|---|--|
| <p>9.1.1</p> | <p><math>P(A \text{ and/en } B)</math><br/> <math>= P(A) \times P(B)</math><br/> <math>= 0,48 \times 0,28</math><br/> <math>= 0,1248</math></p>   | <p>✓ <math>0,48 \times 0,28</math><br/><br/>                 ✓ answer/antwoord<br/><br/>                 (2)</p>   |
| <p>9.1.2</p> | <p><math>P(A \text{ or } B) = P(A) + P(B)</math><br/> <math>= 0,48 + 0,26</math><br/> <math>= 0,74</math></p>                                     | <p>✓ substitution/verv.<br/>                 ✓ answer/antwoord<br/><br/>                 (2)</p>   |
| <p>9.2.1</p> | <p><math>10 + 6 + x + 5 = 29</math><br/> <math>x = 8</math><br/> <math>41 + 10 + 30 + 6 + 8 + 5 + 25 + y = 130</math><br/> <math>y = 5</math></p> | <p>✓ method/metode<br/>                 ✓ value of/wrde van <math>x</math><br/><br/>                 ✓ method/metode<br/><br/>                 ✓ value of/wrde van <math>y</math><br/>                 (4)</p>   |
| <p>9.2.2</p> | <p><math>P(\text{no nut snack or no snack}) = \frac{41 + 10 + 30}{130} + \frac{5}{130}</math><br/> <math>= \frac{43}{65}</math></p>               | <p>✓ <math>41 + 10 + 3</math><br/>                 ✓ adding/optel 5<br/><br/>                 ✓ answer/antwoord<br/>                 (3)</p>   |
| <p>9.3.1</p> |    | <p>✓ branch at first level<br/> <i>tak by eerste vlak</i><br/><br/>                 ✓ branches at second level/<br/> <i>takke by tweede vlak</i><br/><br/>                 ✓ outcomes/<i>uitkomst</i><br/><br/>                 ✓ probabilities<br/> <i>/moontlikhede</i><br/>                 (4)</p> |



|       |   |   |
|-------|---|---|
| 9.3.2 | $P(BB) + P(CC) = (0,35 \times 0,3) + (0,65 \times 0,7)$ $= 0,56 = 56\%$<br>$0,56 \times 200 = 112 \text{ clients/kliënte}$  | ✓<br>$(0,35 \times 0,3) + (0,65 \times 0,7)$<br>✓ probability/ <i>moontlik-hede</i><br>✓ answer/ <i>antwoord</i><br>(3) |
| 9.3.3 | Number of clients who chose different meals/ <i>Getal kliënte wat verskillende maaltye gekies het</i> = $200 - 112 = 88$<br><br>More clients preferred to make the same choice/ <i>Meer kliënte verkies om dieselfde keuse te maak.</i> | ✓ 88<br><br>✓ conclusion/ <i>gevolgtr.</i><br>(2)<br><b>[20]</b>  |

**TOTAL/TOTAAL: 150**