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**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/*GRAAD* 12**

**JUNE/*JUNIE* 2026**

**MATHEMATICS P1 MARKING GUIDELINE/  
*WISKUNDE V1 NASIENRIGLYN***

**MARKS/*PUNTE*: 150**



This marking guideline consists of 19 pages.  
*Hierdie nasienriglyn bestaan uit 19 bladsye.*

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Proudly South African

**NOTE/LET WEL:**

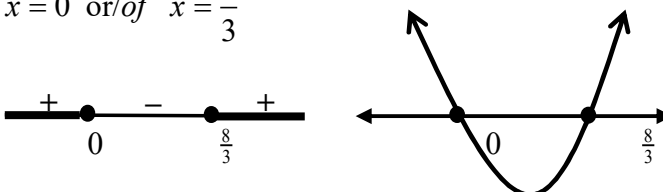
- If a candidate answered a question TWICE, mark the FIRST attempt ONLY.  
*Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk SLEGS die EERSTE poging.*
- Consistent accuracy(CA) applies in ALL aspects of the marking guideline.  
*Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die nasienriglyn.*
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.  
*Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.*
- The mark for substitution is awarded for substitution into the correct formula.  
*Die punt vir substitusie word toegeken vir substitusie in die korrekte formule.*

**QUESTION/VRAAG 1**

|       |                                                                                                                                                                                                    |                                                                                                                |                                                                                     |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1.1.1 | $x(x-3) + 2(x-3) = 0$<br>$(x-3)(x+2) = 0$<br>$x-3 = 0$ or/of $x+2 = 0$<br>$x = 3$ or/of $x = -2$                                                                                                   | <div>Answers only –<br/>Full Marks<br/>Slegs antwoorde -<br/>Volpunte</div>                                    | ✓ factors / <i>faktore</i><br><br>✓ both answers / <i>beide antwoorde</i><br>(2)    |
| 1.1.2 | $3x^2 - 5x - 4 = 0$<br>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(-4)}}{2(3)}$ $x = \frac{5 \pm \sqrt{73}}{6}$<br>$\therefore x = -0,59$ or / of $x = 2,26$ | <div>Penalise 1 mark for<br/>incorrect rounding off./<br/>Penaliseer 1 punt vir<br/>verkeerde afronding.</div> | ✓ substitution / <i>vervanging</i><br><br><br>✓✓ <i>x-values / x-waardes</i><br>(3) |





|       |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                    |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1.3 | $3x^2 - 8x \geq 0$<br>$x(3x - 8) \geq 0$<br>critical values/kritieke waardes<br>$x = 0$ or/of $x = \frac{8}{3}$<br><br>$x \leq 0$ or/of $x \geq \frac{8}{3}, x \in \mathbf{R}$<br><b>OR/OF</b><br>$x \in (-\infty; 0]$ or/of $x \in [\frac{8}{3}; \infty), x \in \mathbf{R}$ | ✓ factors / <i>faktore</i><br><br>✓ critical values / <i>kritieke waardes</i><br><br>✓✓ $x \leq 0$ or/of $x \geq \frac{8}{3}, x \in \mathbf{R}$<br>(accuracy / <i>akkuraatheid</i> )<br><b>OR/OF</b><br>$x \in (-\infty; 0]$ or/of $x \in [\frac{8}{3}; \infty), x \in \mathbf{R}$ |
| 1.1.4 | $\frac{3}{2x} = \sqrt{\frac{6}{x}} - 1$<br>$\frac{3}{2x} + 1 = \sqrt{\frac{6}{x}}$<br>$\left(\frac{3}{2x} + 1\right)^2 = \left(\sqrt{\frac{6}{x}}\right)^2$<br>$\frac{9}{4x^2} + \frac{3}{x} + 1 = \frac{6}{x}$<br>$9 + 12x + 4x^2 = 24x$<br>$4x^2 - 12x + 9 = 0$<br>$(2x - 3)(2x - 3) = 0$<br>$\therefore x = \frac{3}{2}$                                   | ✓ isolating surd / <i>isoleer wortelvorm</i><br><br>✓ idea of squaring both sides /<br><i>idee om albei kante te kwadreer</i><br><br>✓ actual squaring / <i>kwadrering</i><br><br>✓ standard form / <i>standaardvorm</i><br><br>✓ answer / <i>antwoord</i>                         |

(4)

(5)





|     |                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.2 | $y = 3x - 1$ .....(1)<br>$x^2 + 2xy = 3y^2 - 7$ .....(2)<br><br>(1) into/in (2) :<br>$x^2 + 2x(3x - 1) = 3(3x - 1)^2 - 7$<br>$x^2 + 6x^2 - 2x = 27x^2 - 18x + 3 - 7$<br>$20x^2 - 16x - 4 = 0$<br>$5x^2 - 4x - 1 = 0$<br>$(5x + 1)(x - 1) = 0$<br>$5x + 1 = 0$ or / of $x - 1 = 0$<br>$x = -\frac{1}{5}$ or / of $x = 1$<br>$y = -\frac{8}{5}$ or / of $y = 2$                   | ✓ $y = 3x - 1$<br><br>✓ substitution / <i>vervanging</i><br>✓ expanding / <i>uitbreiding</i><br>✓ standard form / <i>standaardvorm</i><br><br>✓ x-values / <i>waardes</i><br>✓ y-values / <i>waardes</i><br>(6)                                                                                                                                                                                                   |
| 1.3 | $x + y = 4$<br>$x^2 + 2xy + y^2 = 16$<br>$x^2 + y^2 = 14$ .....(1)<br>$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$<br>$= (4)(14 - 1)$<br>$= 52$<br><br><p style="text-align: center;"><b>OR / OF</b></p> $(x + y)^3 = (4)^3$<br>$(x + y)(x^2 + 2xy + y^2) = 64$<br>$x^3 + 3x^2y + 3xy^2 + y^3 = 64$<br>$x^3 + y^3 + 3xy(x + y) = 64$<br>$x^3 + y^3 + 3(1)(4) = 64$<br>$x^3 + y^3 = 52$ | ✓ square both sides / <i>kwadreer beide kante</i><br>✓ $x^2 + y^2 = 14$<br><br>✓ sum of cubes factors /<br><i>som van derdemagte faktore</i><br>✓ answer / <i>antwoord</i><br>(4)<br><br><p style="text-align: center;"><b>OR / OF</b></p> ✓ cube both sides / <i>derdemag beide kante</i><br>✓ expansion / <i>uitbreiding</i><br>✓ grouping / <i>groepering</i><br><br>✓ answer / <i>antwoord</i><br>(4)<br>[24] |



## QUESTION/VRAAG 2



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|       |                                                                                                                           |                                                                                                                   |
|-------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 2.1.1 | $\frac{p}{p+3} = \frac{p-2}{p}$ $p^2 = p^2 + p - 6$ $\therefore p = 6$                                                    | ✓ equating ratios / gelykstel van verhoudings<br>✓ simplification / vereenvoudiging<br>✓ answer / antwoord<br>(3) |
| 2.1.2 | $9; 6; 4; \dots$ $r = \frac{2}{3}$ $\therefore -1 < \frac{2}{3} < 1$                                                      | ✓ value of $r$ / waarde van $r$<br>✓ reason / rede<br>(2)                                                         |
| 2.1.3 | $S_{\infty} = \frac{a}{1-r}$ $= \frac{9}{1-\frac{2}{3}}$ $= 27$                                                           | ✓ substitution / vervanging<br>✓ answer / antwoord<br>(2)                                                         |
| 2.2.1 | $2 \cdot 3^{n-1} = 13122$ $3^{n-1} = 6561 = 3^8$ $\therefore n-1 = 8$ $n = 9$ $\therefore \sum_{n=1}^9 2 \cdot (3)^{n-1}$ | ✓ equating / geslykstelling<br>✓ value of $n$ / waarde van $n$<br>✓ answer / antwoord<br>(3)                      |
| 2.2.2 | $S_n = \frac{a(r^n - 1)}{r - 1}$ $= \frac{2(3^9 - 1)}{3 - 1}$ $= 19682$                                                   | ✓ substitution / vervanging<br>✓ answer / antwoord<br>(2)                                                         |
|       |                                                                                                                           | [12]                                                                                                              |



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## QUESTION/VRAAG 3

|       |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                        |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1.1 | <p><math>T_2 = 4</math> and / en <math>T_3 = 13</math></p>                                                                                                                                                                                        | <p>✓ 1<sup>st</sup> differences / 1<sup>ste</sup> verskille</p> <p>✓ answer / antwoord</p> <p>(2)</p>                                                                                                                                  |
| 3.1.2 | $\begin{array}{lll} 2a = 6 & 3a + b = 3 & a + b + c = 1 \\ a = 3 & 3(3) + b = 3 & 3 - 6 + c = 1 \\ & b = -6 & c = 4 \end{array}$ $\therefore T_n = 3n^2 - 6n + 4$                                                                                 | <p>✓ value of <math>a</math> / waarde van <math>a</math></p> <p>✓ value of <math>b</math> / waarde van <math>b</math></p> <p>✓ value of <math>c</math> / waarde van <math>c</math></p> <p>(3)</p>                                      |
| 3.2   | $12 - d ; 12 ; 12 + d$ <p>Applying Pythagoras :</p> $(12 + d)^2 = (12)^2 + (12 - d)^2$ $144 + 24d + d^2 = 144 + 144 - 24d + d^2$ $48d = 144$ $d = 3$ <p><math>\therefore</math> short side = 9</p> <p><math>\therefore</math> hypotenuse = 15</p> | <p>✓ sequence in terms of <math>d</math> / ry in terme van <math>d</math></p> <p>✓ use of Pythagoras / gebruik van Pythagoras</p> <p>✓ value of <math>d</math> / waarde van <math>d</math></p> <p>✓ answers / antwoorde</p> <p>(4)</p> |





|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.3 | $\sum_{p=5}^{20} (p+1)^2 - \sum_{p=5}^{20} (p^2)$ $= (6^2 + 7^2 + \dots + 21^2) - (5^2 + 6^2 + \dots + 20^2)$ $= 21^2 - 5^2$ $= 416$ <p><b>OR / OF</b></p> $\sum_{p=5}^{20} (p+1)^2 - \sum_{p=5}^{20} (p^2)$ $= \sum_5^{20} (2p+1)$ $= 11 + 13 + 15 + \dots + 41$ $\therefore S_{16} = \frac{16}{2}(11+41)$ $= 416$ <p><b>OR / OF</b></p> $36 + 49 + 64 + \dots + 441$ $S_{16} = \frac{16}{2}(36 + 441) = 3816$ $25 + 36 + 49 + \dots + 400$ $S_{16} = \frac{16}{2}(25 + 400) = 3400$ $3816 - 3400$ $= 416$ | <p>✓ expanding / <i>uitbreiding</i><br/>         ✓ expanding / <i>uitbreiding</i></p> <p>✓ simplification / <i>vereenvoudiging</i><br/>         ✓ answer / <i>antwoord</i></p> <p><b>OR / OF</b></p> <p>✓ combining Sigma notation<br/> <i>kombineer Sigma notasie</i><br/>         ✓ expanding / <i>uitbreiding</i></p> <p>✓ substitution / <i>vervangings</i><br/>         ✓ answer / <i>antwoord</i></p> <p><b>OR / OF</b></p> <p>✓ expanding / <i>uitbreiding</i></p> <p>✓ both sums / <i>beide somme</i></p> <p>✓ answer / <i>antwoord</i></p> <p>(4)</p> <p><b>[13]</b></p> |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|







## QUESTION/VRAAG 4

|     |                                                                                                       |                                                                                                                                  |
|-----|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 4.1 | $x \neq 4; x \in \mathbb{R}$                                                                          | ✓ answer / <i>antwoord</i><br>(1)                                                                                                |
| 4.2 | $y = 3$                                                                                               | ✓ answer / <i>antwoord</i><br>(1)                                                                                                |
| 4.3 | $f(0) = \frac{6}{0-4} + 3$ $= \frac{3}{2}$<br>$\frac{6}{x-4} + 3 = 0$ $6 = -3x + 12$ $3x = 6$ $x = 2$ | ✓ answer / <i>antwoord</i><br><br>✓ $y = 0$<br><br>✓ answer / <i>antwoord</i><br>(3)                                             |
| 4.4 |                                                                                                       | ✓ x- & y-intercepts<br><i>x- &amp; y-afsnitte</i><br><br>✓ asymptotes / <i>asimptote</i><br><br>✓ shape / <i>vorm</i><br><br>(3) |
| 4.5 | $2 \leq x < 4$                                                                                        | ✓✓ answer / <i>antwoord</i><br>(2)                                                                                               |
|     |                                                                                                       | [10]                                                                                                                             |





## QUESTION/VRAAG 5

|       |                                                                                                                                                                                           |                                                                                                                    |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 5.1.1 | $x = \frac{-b}{2a}$ $= \frac{-8}{2(-2)}$ $= 2$ $y = -2(2)^2 + 8(2) + 10$ $= 18$ $A(2 ; 18)$                                                                                               | <p>✓ x-value / x-waarde</p> <p>✓ y-value / y-waarde</p> <p>(2)</p>                                                 |
| 5.1.2 | $-2x^2 + 8x + 10 = 0$ $(-2x + 10)(x + 1) = 0$ $x = 5 \text{ or / of } x = -1$ $\therefore BC = 6 \text{ units / eenhede}$                                                                 | <p>✓ equating to 0 / gelyk stel aan 0</p> <p>✓ x-intercepts / x-afsnitte</p> <p>✓ answer / antwoord</p> <p>(3)</p> |
| 5.2   | $m_g = \frac{-14 - 0}{6 + 1} = -2$ $m = \frac{-14 - 0}{6 + 1} = -2$ <p><b>OR/OF</b></p> $y - 0 = -2(x + 1)$ $y = -2x - 2$ $y = -2x + c$ $0 = 2(-1) + c$ $c = -2$ $\therefore y = -2x - 2$ | <p>✓ gradient / gradiënt</p> <p>✓ equation / vergelyking</p> <p>(2)</p>                                            |





|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.3 | $f'(x) = -4x + 8 = -8$ $-4x = -16$ $x = 4$ $y = -2(4)^2 + 8(4) + 10$ $= 10$ $y = -8x + k$ $10 = -8(4) + k$ $k = 42$ <p><b>OR/OF</b></p> $-2x^2 + 8x + 10 = -8x + k$ $-2x^2 + 16x + 10 - k = 0$ <p>tangent with one real root: / raaklyn met een reële wortel<br/>(equal roots) / (gelyke wortels)</p> $b^2 - 4ac = 0$ $(16)^2 - 4(-2)(10 - k) = 0$ $256 + 8(10 - k) = 0$ $256 + 80 - 8k = 0$ $-8k = -336$ $k = 42$ $\therefore h(x) = -8x + 42$ | <p>✓ equating <math>f'</math> to <math>-8</math> / stel <math>f'</math> gelyk aan <math>-8</math></p> <p>✓ <math>x = 4</math> and/en <math>y = 10</math></p> <p>✓ substituting point / vervanging van punt<br/>✓ answer / antwoord</p> <p><b>OR/OF</b></p> <p>✓ equating <math>f</math> to <math>h</math> / stel <math>f</math> gelyk aan <math>h</math></p> <p>✓ standard form / standaardvorm</p> <p>✓ substitution into delta /<br/>vervanging in delta</p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(4)</p> |
| 5.4 | $f(x) = -2(x+1)^2 + 8(x+1) + 10$ $= -2x^2 - 4x - 2 + 8x + 8 + 10$ $= -2x^2 + 4x + 16$ <p><b>OR/OF</b></p> $A(2;18) \text{ and/en } a = -2$ $f(x) = -2(x-2)^2 + 18$ $f(x+1) = -2(x+1-2)^2 + 18$ $= -2(x-1)^2 + 18$                                                                                                                                                                                                                               | <p>✓ replace <math>x</math> with <math>(x+1)</math><br/>vervang <math>x</math> met <math>(x+1)</math></p> <p>✓ answer / antwoord</p> <p><b>OR/OF</b></p> <p>✓ replace <math>x</math> with <math>(x+1)</math><br/>vervang <math>x</math> met <math>(x+1)</math></p> <p>✓ answer / antwoord</p> <p style="text-align: right;">(2)</p>                                                                                                                                                                                             |





|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 5.5 | $p > 11$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ✓✓ answer / antwoord<br>(2) |
|     | <p>Few approaches for teaching and learning / <i>Paar benaderings vir onderrig en leer</i></p> <p><b>Option 1 / Opsie 1</b></p> $x = -\frac{8}{2(-2)} = 2$ $y = -(2)^2 + 8(2) + 3$ $= 11$ <p>T.P(2;11)</p> $\therefore p > 11$ <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-left: 20px;"> <math>y = p</math><br/> <math>y = 11</math><br/> <math>y = -2x^2 + 8x + 3</math> </div> </div> <p><b>Option 2 / Opsie 2</b></p> $-2x^2 + 8x + 3 = p$ $-2x + 8x + 10 = p + 7$ <p>For non-real :</p> $p + 7 > 18$ $\therefore p > 11$ <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-left: 20px;"> <math>y = p + 7</math><br/> <math>y = 18</math><br/> <math>f(x) = -2x^2 + 8x + 10</math> </div> </div> <p><b>Option 3 / Opsie 3</b></p> $-2x^2 + 8x + 3 - p = 0$ <p>For non-real: / <i>Vir nie - reël:</i></p> $b^2 - 4ac < 0$ $(8)^2 - 4(-2)(3 - p) < 0$ $64 + 24 - 8p < 0$ $-8p < -88$ $\therefore p > 11$ |                             |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | [15]                        |





## QUESTION/VRAAG 6

|       |                                                                                                                 |                                                                                                                      |
|-------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 6.1   | $y = \log_a x$<br>$-1 = \log_a \left( \frac{1}{2} \right)$<br>$\frac{1}{a} = \frac{1}{2}$<br>$\therefore a = 2$ | ✓ substitution / <i>vervang</i><br><br>✓ answer / <i>antwoord</i><br>(2)                                             |
| 6.2   | $f : y = \log_2 x$<br>$f^{-1} : x = \log_2 y$<br>$\therefore y = 2^x$                                           | ✓ swapping $x$ and $y$ / <i>omruil van <math>x</math> en <math>y</math></i><br><br>✓ answer / <i>antwoord</i><br>(2) |
| 6.3.1 | $g(x) = -\log_2 x$ <b>OR/OF</b> $g(x) = \log_{\frac{1}{2}} x$                                                   | ✓ answer / <i>antwoord</i><br>(1)                                                                                    |
| 6.3.2 | decreasing / <i>dalend</i>                                                                                      | ✓ answer / <i>antwoord</i><br>(1)                                                                                    |
| 6.4   | $0 < x < \frac{1}{2}$                                                                                           | ✓✓ answer / <i>antwoord</i><br>(2)                                                                                   |
|       |                                                                                                                 | <b>[8]</b>                                                                                                           |



## QUESTION/VRAAG 7



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|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                 |      |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 7.1   | $A = P(1+i)^{12n}$ $10\,000 = 5\,000 \left(1 + \frac{9\%}{12}\right)^{12n}$ $2 = (1,0075)^{12n}$ $\therefore 12n = \log_{1,0075}(2)$ $12n = 92,76 \text{ months / maande}$ $n = 7,73 \text{ years / jare}$                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>✓ substitution / vervanging</li> <li>✓ simplification / vereenvoudiging</li> <li>✓ use of logs / gebruik van logs</li> <li>✓ answer / antwoord</li> </ul>                                                                                                                                | (4)  |
| 7.2   | $1 + i_{\text{eff}} = \left(1 + \frac{i_{\text{nom}}}{m}\right)^m$ $1 + 12,13\% = \left(1 + \frac{i_{\text{nom}}}{12}\right)^{12}$ $\sqrt[12]{1 + 12,13\%} = 1 + \frac{i_{\text{nom}}}{12}$ $\therefore i_{\text{nom}} = 12 \left(\sqrt[12]{1 + 12,13\%} - 1\right)$ $= 0,11503662039$ $\Rightarrow \text{nominal rate} = 11,50 \text{ p.a compounded monthly}$ $\text{nominale koers} = 11,50 \text{ p.j maandeliks saamgestel}$                                              | <ul style="list-style-type: none"> <li>✓ substitution / vervanging</li> <li>✓ subject of the formula / onderwerp van die formule</li> <li>✓ answer / antwoord</li> </ul>                                                                                                                                                        | (3)  |
| 7.3.1 | $A = P(1+i)^n$ $= 20\,000 \left(1 + \frac{7,2\%}{4}\right)^8$ $= R\,23068,12$                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>✓ substitution / vervanging</li> <li>✓ answer / antwoord</li> </ul>                                                                                                                                                                                                                      | (2)  |
| 7.3.2 | $A = \left[23\,068,12 \left(1 + \frac{7,8\%}{12}\right)^{24} - x\right] \left(1 + \frac{7,8\%}{12}\right)^{36}$ $30\,871,61 = 23\,068,12 \left(1 + \frac{7,8\%}{12}\right)^{60} - x \left(1 + \frac{7,8\%}{12}\right)^{36}$ $x \left(1 + \frac{7,8\%}{12}\right)^{36} = 23\,068,12 \left(1 + \frac{7,8\%}{12}\right)^{60} - 30\,871,61$ $x = \frac{23\,068,12 \left(1 + \frac{7,8\%}{12}\right)^{60} - 30\,871,61}{\left(1 + \frac{7,8\%}{12}\right)^{36}}$ $x = R\,2\,500,00$ | <ul style="list-style-type: none"> <li>✓ <math>23\,068,12 \left(1 + \frac{7,8\%}{12}\right)^{24}</math></li> <li>✓ multiply by <math>\left(1 + \frac{7,8\%}{12}\right)^{36}</math></li> <li>✓ expanding / uitbreiding</li> <li>✓ x subject of the formula / x onderwerp van die formule</li> <li>✓ answer / antwoord</li> </ul> | (5)  |
|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                 | [14] |



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## QUESTION/VRAAG 8

Penalise 1 mark for incorrect notation in 8.1 only  
 Penaliseer 1 punt vir verkeerde notasie, slegs in 8.1

|       |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                             |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8.1   | $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{5(x+h)^2 + 1 - (5x^2 + 1)}{h}$ $= \lim_{h \rightarrow 0} \frac{5x^2 + 10xh + 5h^2 + 1 - 5x^2 - 1}{h}$ $= \lim_{h \rightarrow 0} \frac{10xh + 5h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(10x + 5h)}{h}$ $= \lim_{h \rightarrow 0} (10x + 5h)$ $= 10x$ | <p>✓ substitution / vervanging</p> <p>✓ simplification / vereenvoudiging</p> <p>✓ factorisation / faktorisering<br/>(dividing by <math>h</math> / deel deur <math>h</math>)</p> <p>✓ answer / antwoord</p> <p>(4)</p>                                       |
| 8.2.1 | $\frac{dy}{dx} = 6x^2 - \frac{1}{5}$                                                                                                                                                                                                                                                                                                           | <p>✓ <math>6x^2</math></p> <p>✓ <math>\frac{1}{5}</math></p> <p>(2)</p>                                                                                                                                                                                     |
| 8.2.2 | $D_x \left[ \frac{\sqrt{x^5 + 5}}{x^2} \right]$ $= D_x \left[ \frac{x^{\frac{5}{2}}}{x^2} + \frac{5}{x^2} \right]$ $= D_x \left[ x^{\frac{1}{2}} + 5x^{-2} \right]$ $= \frac{1}{2}x^{-\frac{1}{2}} - 10x^{-3}$                                                                                                                                 | <p>✓ <math>x^{\frac{1}{2}}</math>      ✓ <math>5x^{-2}</math></p> <p>✓ <math>\frac{1}{2}x^{-\frac{1}{2}}</math>      ✓ <math>-10x^{-3}</math></p> <p>(4)</p>                                                                                                |
| 8.3   | $h(-1) = 3(-1)^2 + 4(-1)$ $= -1$ $T(-1; -1)$ $m = f'(-1) = 6(-1) + 4 = -2$ $y + 1 = -2(x + 1)$ $y = -2x - 3$                                                                                                                                                                                                                                   | <p>✓ coordinates of T / koördinate van T</p> <p>✓ derivative = <math>6x + 4</math>/<br/>afgeleide = <math>6x + 4</math></p> <p>✓ <math>m = -2</math></p> <p>✓ substitution of <math>m = -2</math> # point(-1; -1)</p> <p>✓ answer / antwoord</p> <p>(5)</p> |





## QUESTION/VRAAG 9

|     |                                                                                                                                                                                                                                 |                                                                                                                |     |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----|
| 9.1 | $f(x) = x^3 - 3x^2 - 9x - 5$<br>$f(-1) = (-1)^3 - 3(-1)^2 - 9(-1) - 5$<br>$= -1 - 3 + 9 - 5$<br>$= 0$<br>$\therefore (x + 1)$ is a factor. / is 'n faktor                                                                       | ✓ substitution of $-1$ and getting to $0$ /<br>vervanging van $-1$ en kry gelyk<br>aan $0$                     | (1) |
| 9.2 | y-int: (let $x = 0$ ) $\Rightarrow y = -5$<br>x-ints: (let $y = 0$ ):<br>$f(x) = x^3 - 3x^2 - 9x - 5 = 0$<br>$(x + 1)(x^2 - 4x - 5) = 0$<br>$(x + 1)(x + 1)(x - 5) = 0$<br>$\therefore x = -1$ or / of $x = -1$ or / of $x = 5$ | ✓ y-intercept / y-afsnit<br><br>✓ quadratic bracket / kwadratiese<br>hakkie<br><br>✓ x-intercepts / x-afsnitte | (3) |
| 9.3 | $f(x) = x^3 - 3x^2 - 9x - 5$<br>$f'(x) = 3x^2 - 6x - 9 = 0$<br>$x^2 - 2x - 3 = 0$<br>$(x + 1)(x - 3) = 0$<br>$x = -1$ or / of $x = 3$<br>$y = 0$ or / of $y = -32$<br>$P(-1; 0)$ ; $Q(3; -32)$                                  | ✓ $f'(x) = 0$<br><br>✓ x-values / x-waardes<br><br>✓ y-values / y-waardes                                      | (3) |
| 9.4 |                                                                                                                                                                                                                                 | ✓ x- and y- intercepts<br>x- en y- afsnitte<br><br>✓ turning points / draaipunte<br><br>✓ shape / vorm         | (3) |







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|       |                                                                                                                                                                                                                |                                                                                                                                                                         |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.5.1 | $x < -1$ or / of $x > 3$ Accept/Aanvaar: $x \leq -1$ or / of $x \geq 3$                                                                                                                                        | ✓✓ answer / antwoord<br>(2)                                                                                                                                             |
| 9.5.2 | $f''(x) > 0$<br>$6x - 6 > 0$<br>$6x > 6$<br>$\therefore x > 1$<br><br><b>OR / OF</b><br><br>$x = \frac{-1+3}{2} = 1$<br>$\therefore x > 1$<br><br><b>OR / OF</b><br><br>$x > 1$ (answer only / slegs antwoord) | ✓ method / metode<br>✓ answer / antwoord<br><br><b>OR / OF</b><br><br>✓ method / metode<br>✓ answer / antwoord<br><br><b>OR / OF</b><br><br>✓✓ answer / antwoord<br>(2) |
| 9.5.3 | $-1 < x < 3$ or / of $x > 5$                                                                                                                                                                                   | ✓✓ answer / antwoord<br>(2)                                                                                                                                             |
|       |                                                                                                                                                                                                                | <b>[16]</b>                                                                                                                                                             |



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## QUESTION/VRAAG 10

|     |                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10. | $d = 0$ (h passes through origin / <i>h gaan deur oorsprong</i> )<br>$\therefore h(x) = -x^3 + bx^2 + cx$<br>$-\frac{7}{2} = -(-1)^3 + b(-1)^2 + c(-1)$<br>$-9 = 2b - 2c \dots\dots\dots(1)$<br><br>$h'(x) = -3x^2 + 2bx + c$<br>$h'(-1) = -3(-1)^2 + 2b(-1) + c = 0$<br>$3 = -2b + c \dots\dots\dots(2)$<br><br>$(1) + (2): -c = -6 \Rightarrow c = 6$<br><br>$3 = -2b + 6$<br>$\therefore b = \frac{3}{2}$ | ✓ substitution into $h(x)$ /vervanging in $h(x)$<br>✓ equation 1 / vergelyking 1<br><br><br>✓ $h'(x)$<br>✓ substitution and equating to 0 /<br>vervanging en gelykstel aan 0<br><br><br>✓ equation 2 / vergelyking 2<br><br><br>✓ value of c / waarde van c<br>✓ value of b / waarde van b |
|     |                                                                                                                                                                                                                                                                                                                                                                                                              | [7]                                                                                                                                                                                                                                                                                        |





## QUESTION/VRAAG 11

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1.1        | $P(A \text{ or / of } B) = 1 - P(A \text{ or / of } B)'$ $= 1 - 0,2775$ $= 0,7225$                                                                                                                                                                                                                                                                                                                                                                  | ✓ answer / antwoord<br>(1)                                                                                                                                                                                        |
| 11.1.2        | $P(A \text{ or / of } B) = 0,7225$ $P(A) + P(B) = 0,63 + 0,25 = 0,88$ $\therefore P(A \text{ or / of } B) \neq P(A) + P(B)$ $\Rightarrow \text{not mutually exclusive / nie onderling uitsluitend}$ <p><b>OR/OF</b></p> $P(A \text{ and / en } B) = P(A) + P(B) - P(A \text{ or / of } B)$ $= 0,63 + 0,25 - 0,7225$ $= 0,1575$ $\therefore P(A \text{ and / en } B) \neq 0$ $\Rightarrow \text{not mutually exclusive / nie onderling uitsluitend}$ | ✓ calculation to support answer<br>berekening om antwoord te staaf<br>✓ answer / antwoord<br><p><b>OR/OF</b></p> ✓ calculation to support answer<br>berekening om antwoord te staaf<br>✓ answer / antwoord<br>(2) |
| 11.1.3        | $P(A) \times P(B) = 0,63 \times 0,25 = 0,1575$ $P(A \text{ and / en } B) = 0,1575 \quad (\text{from / vanaf } 11.1.2)$ $\therefore P(A \text{ and / en } B) = P(A) \times P(B)$ $\Rightarrow \text{events are independent / gebeurtenisse is onafhanklik}$                                                                                                                                                                                          | ✓ calculation to support answer/<br>berekening om antwoord te staaf<br>✓ answer / antwoord<br>(2)                                                                                                                 |
| 11.2.1        | $(i) = \frac{6}{10} \text{ and / en } (ii) = \frac{4}{10}$ $(iii) = \frac{6}{8} \text{ and / en } (iv) = \frac{2}{8}$                                                                                                                                                                                                                                                                                                                               | ✓ $\frac{6}{10}$ and / en $\frac{4}{10}$<br>✓ $\frac{6}{8}$ and / en $\frac{2}{8}$<br>(2)                                                                                                                         |
| 11.2.2<br>(a) | $\left( \frac{6}{10} \times \frac{4}{10} \times \frac{3}{9} \right) + \left( \frac{4}{10} \times \frac{6}{9} \times \frac{3}{9} \right)$ $= \frac{2}{25} + \frac{4}{45}$ $= 0,08 + 0,08$ $= 0,17$                                                                                                                                                                                                                                                   | ✓ adding of branches<br>optel van takke<br>✓ answer / antwoord<br>(2)                                                                                                                                             |





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|               |                                                                                                                                                                                                        |                                                                                                                                                            |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.2.2<br>(b) | $P(\text{atleastoneblue}) = 1 - P(\text{allwhite})$<br>$P(\text{tenminsteeenblou}) = 1 - P(\text{almalwit})$<br>$= 1 - \left(\frac{6}{10} \times \frac{6}{10} \times \frac{6}{10}\right)$<br>$= 0,784$ | ✓ using rule / gebruik van reël<br><br>✓ answer / antwoord<br>(2)                                                                                          |
| 11.3.1        | <p style="text-align: right;"><b>S = 1</b></p>                                                                                                                                                         | ✓ $P(A \text{ or/of } B)' = d$<br><b>and/en</b><br>$P(A \text{ and/en } B) = x$<br><br>✓ $P(\text{only/slegs } A) = x + 2d$<br><br>✓ $P(B) = d$<br><br>(3) |
| 11.3.2        | $x + 2d + x + d + d = 1$<br>$2x + 4d = 1$<br>$x + 2d = \frac{1}{2}$<br><br>$P(\text{only / slegs } A) = \frac{1}{2} / 0,5$                                                                             | ✓ equation / vergelyking<br><br>✓ answer / antwoord<br>(2)                                                                                                 |
|               |                                                                                                                                                                                                        | [16]                                                                                                                                                       |
|               |                                                                                                                                                                                                        | <b>TOTAL/TOTAAL: 150</b>                                                                                                                                   |



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## MATHEMATICS P1

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**NOTES**

|       |                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                      |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1.1 | Answer Only : $x = -2$ or / of $x = 3$                                                                                                                                                                                                                                                                                                                                                                         | Full Marks $\left(\frac{2}{2}\right)$                                                                                                                                |
| 1.1.1 | $x = 0$ or / of $x = 3$                                                                                                                                                                                                                                                                                                                                                                                        | No Marks $\left(\frac{0}{2}\right)$                                                                                                                                  |
| 1.1.3 | No factors but correct critical values                                                                                                                                                                                                                                                                                                                                                                         | Two marks up to this stage.<br>Next two marks will be for accuracy of answer (combo).                                                                                |
| 1.1.4 | <p><b>Alternative solution:</b></p> $\frac{3}{2}x^{-1} - \sqrt{6}x^{\frac{1}{2}} + 1 = 0$ $x^{\frac{1}{2}} = \frac{-(-\sqrt{6}) \pm \sqrt{(-\sqrt{6})^2 - 4\left(\frac{3}{2}\right)(1)}}{2\left(\frac{3}{2}\right)}$ $x^{\frac{1}{2}} = \frac{\sqrt{6}}{3}$ $\left(x^{\frac{1}{2}}\right)^{-2} = \left(\frac{\sqrt{6}}{3}\right)^{-2}$ $x = \left(\frac{3}{\sqrt{6}}\right)^2$ $x = \frac{9}{6} = \frac{3}{2}$ | <p>✓ standard form</p> <p>✓ substitution</p> <p>✓ <math>x^{\frac{1}{2}} = \frac{\sqrt{6}}{3}</math></p> <p>✓ raising both sides to -2</p> <p>✓ answer</p> <p>(5)</p> |
| 1.1.4 | Squaring individual terms                                                                                                                                                                                                                                                                                                                                                                                      | Penalise & CA as long as it remains quadratic.                                                                                                                       |
| 1.2   | Normal C/A marking for simultaneous equations.<br>Last mark is an independent mark                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                      |
| 2.2   | Candidate cannot assume but first need to determine that it is a Geometric series.                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                      |
| 3.2   | Accept candidates attempt – if scale factor is applied to 3 – 4 – 5 Pythagorean-triplet.                                                                                                                                                                                                                                                                                                                       | <p>✓ 3 – 4 – 5</p> <p>✓ scale factor 3</p> <p>✓ 9</p> <p>✓ 15</p>                                                                                                    |
| 3.3   | Answer Only $\left(\frac{1}{4}\right)$                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                      |
| 3.3   | Last/3 <sup>rd</sup> Option was misleading, although it yields the correct answer.                                                                                                                                                                                                                                                                                                                             | Should be removed                                                                                                                                                    |
|       | <p>To be replaced with: <b>ALTERNATIVE SOLUTION</b></p> <p><i>Difference</i> = <math>8[(36 + 441) - (25 + 400)]</math></p> <p>= <math>8(52)</math></p> <p>= 416</p>                                                                                                                                                                                                                                            | <p>✓ <math>(36 + 441) \&amp; (25 + 400)</math></p> <p>✓ 52</p> <p>✓ <math>\times 8</math></p> <p>✓ answer</p>                                                        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                            |                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <p><b>EXPLANATION: This is true because of:</b></p> $\sum_1 = \begin{matrix} T_1 & T_2 & T_3 & & T_8 & T_9 & & T_{14} & T_{15} & T_{16} \\ (36 + 49 + 64 + 81 + 100 + 121 + 144 + 169 + 196 + 225 + 256 + 289 + 324 + 361 + 400 + 441) \end{matrix}$ $\sum_2 = \begin{matrix} t_1 & t_2 & t_3 & & t_8 & t_9 & & t_{14} & t_{15} & t_{16} \\ (25 + 36 + 49 + 64 + 81 + 100 + 121 + 144 + 169 + 196 + 225 + 256 + 289 + 324 + 361 + 400) \end{matrix}$ $D = [(T_1+T_{16}) - (t_1 + t_{16})] + [(T_2+T_{15}) - (t_2+t_{15})] \dots \dots \dots [(T_8+T_9) - (t_8+t_9)]$ $D = [(36+441) - (25+400)] + [(49+400) - (36+361)] + [(64+361) - (49+324)] \dots [(169+196) - (144+169)]$ $= 8(52)$ $= 416$ |                                                                                                                                                                                                                                                                            |                                             |
| 4.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Accuracy (Combo)                                                                                                                                                                                                                                                           |                                             |
| 5.1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Accept other Mathematically correct alternatives<br>Eg. Using derivative = 0                                                                                                                                                                                               |                                             |
| 5.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Candidate cannot assume that D and E are symmetrical.<br>If learner assumes s/he loses first two marks. C/A the last two marks. Learner can get max $\left(\frac{2}{4}\right)$                                                                                             |                                             |
| 5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Accuracy marks                                                                                                                                                                                                                                                             |                                             |
| 6.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Accept $y = a^x$ (Full marks)                                                                                                                                                                                                                                              |                                             |
| 7.3.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Question states to nearest rand – Penalise for incorrect rounding off.                                                                                                                                                                                                     |                                             |
| 8.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Penalise 1 mark for incorrect notation. Apply CA marking.<br>Look out for candidates that manipulates steps, since they know what the answer should be.<br>Answer Only $\left(\frac{0}{4}\right)$                                                                          |                                             |
| 8.2.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Deriving each of the individual terms $\left(\frac{0}{4}\right)$                                                                                                                                                                                                           |                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | If there are mistakes in getting to differentiable form, CA may be applied <b>only</b> if the first exponent is a fraction and the second is negative.                                                                                                                     |                                             |
| 9.5.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marks may be split                                                                                                                                                                                                                                                         | ✓ $x < -1$ ✓ $x > 3$                        |
| 9.5.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Marks may be split                                                                                                                                                                                                                                                         | ✓ $-1 < x < 3$ ✓ $x > 5$                    |
| 11.2.2 (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>Correction to MG:</b></p> $\left(\frac{6}{10} \times \frac{4}{10} \times \frac{3}{9}\right) + \left(\frac{4}{10} \times \frac{6}{9} \times \frac{3}{9}\right) + \left(\frac{4}{10} \times \frac{3}{9} \times \frac{6}{8}\right)$ $= \frac{121}{450}$ $\approx 0,269$ | <p>✓ adding of branches</p> <p>✓ answer</p> |
| 11.3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Third mark : ✓ $P(B \text{ only}) = d$                                                                                                                                                                                                                                     |                                             |