

# basic education

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

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/GRAAD 11**

**MATHEMATICS P1/WISKUNDE VI**

**NOVEMBER 2016**

**MEMORANDUM**

**MARKS/PUNTE: 150**

**This memorandum consists of 18 pages.  
*Hierdie memorandum bestaan uit 18 bladsye.***

DEPARTMENT OF BASIC EDUCATION
PRIVATE BAG X995, PRETORIA 0001
2016 -11- 1 1
APPROVED MARKING GUIDELINE
PUBLIC EXAMINATION

*DJL*  
12/11/2016

**NOTE:**

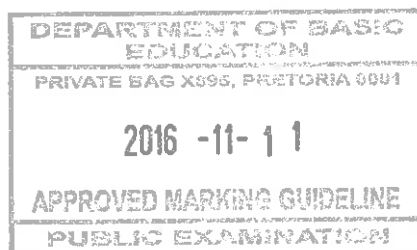
- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking memorandum( If a learner makes a mistake, the mistake has to be followed up. Stop marking the question if the learner commits the second mistake)
- It is unacceptable to assume values/answers in order to solve a problem.
- Penalise once for incorrect rounding off.

**LET WEL:**

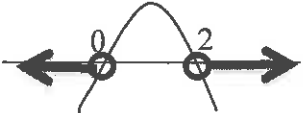


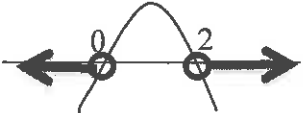


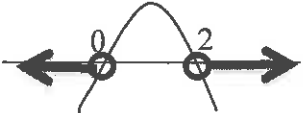


- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing(as 'n leerder 'n fout gemaak het, moet die fout opgevolg word. Hou op om die vraag na te sien as die leerder 'n tweede fout maak)
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.
- Penaliseer een keer vir inkorrekte afronding

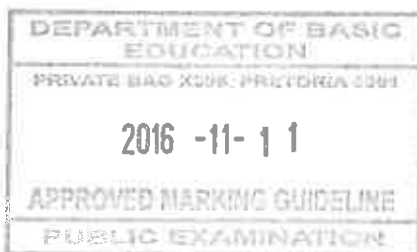
**QUESTION/VRAAG 1**

<p>1.1.1</p>	$3x^2 - 5x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(-1)}}{2(3)}$ $= \frac{5 \pm \sqrt{37}}{6}$ <p><math>x = 1,85</math> or <math>x = -0,18</math></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: auto;">                 Incorrect rounding off,                  max <math>\frac{2}{3}</math> marks             </div>	<p>✓ substitution in the correct quadratic formula                  /vervanging in die korrekte formule</p> <p>✓ answer/antwoord                  ✓ answer/antwoord</p> <p style="text-align: right;">(3)</p>
<p>1.1.2</p>	$x^2 - 6x + 8 = 0$ $(x - 4)(x - 2) = 0$ <p><math>x = 4</math> or <math>x = 2</math></p>	<p>✓ factors/faktore                  OR                  Substitution in the correct quadratic formula/ vervanging in die korrekte kwadratiese formule</p> <p>✓ <math>x = 4</math>                  ✓ <math>x = 2</math></p> <p style="text-align: right;">(3)</p>



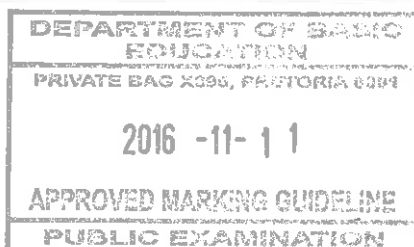
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<p>1.1.3</p>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Option/Opsie 1</b></p> <math display="block">4x - 2x^2 &lt; 0</math> <math display="block">2x(2 - x) &lt; 0</math> <math display="block">x &lt; 0 \text{ or } x &gt; 2</math>  </td> <td style="width: 10%; text-align: center; vertical-align: middle;"> <p><b>OR/OF</b></p> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Option/Opsie 2</b></p> <math display="block">4x - 2x^2 &lt; 0</math> <math display="block">-2x^2 + 4x &lt; 0</math> <math display="block">2x^2 - 4x &gt; 0</math> <math display="block">x(2x - 4) &gt; 0</math> <math display="block">x &lt; 0 \text{ or } x &gt; 2</math>  </td> </tr> <tr> <td colspan="3" style="text-align: center; padding: 10px 0;"> <p>OR</p> </td> </tr> <tr> <td colspan="3" style="text-align: center;">  </td> </tr> </table>	<p><b>Option/Opsie 1</b></p> $4x - 2x^2 < 0$ $2x(2 - x) < 0$ $x < 0 \text{ or } x > 2$ 	<p><b>OR/OF</b></p>	<p><b>Option/Opsie 2</b></p> $4x - 2x^2 < 0$ $-2x^2 + 4x < 0$ $2x^2 - 4x > 0$ $x(2x - 4) > 0$ $x < 0 \text{ or } x > 2$ 	<p>OR</p>						<p>✓ factors/faktore                  ✓ method/metode                  ✓✓ <math>x &lt; 0</math> or <math>x &gt; 2</math></p> <p>Maximum <math>\frac{3}{4}</math> for (4)                  incorrect notation</p> <p>Maksimum <math>\frac{3}{4}</math> vir                  verkeerde notasie</p>
<p><b>Option/Opsie 1</b></p> $4x - 2x^2 < 0$ $2x(2 - x) < 0$ $x < 0 \text{ or } x > 2$ 	<p><b>OR/OF</b></p>	<p><b>Option/Opsie 2</b></p> $4x - 2x^2 < 0$ $-2x^2 + 4x < 0$ $2x^2 - 4x > 0$ $x(2x - 4) > 0$ $x < 0 \text{ or } x > 2$ 									
<p>OR</p>											
											



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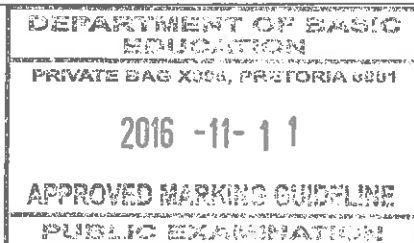
1.1.4	$2^{3x+1} + 2^{3x} = 12$ $2^{3x} [2^1 + 1] = 12$ $2^{3x} \cdot 3 = 12$ $2^{3x} = 4$ $2^{3x} = 2^2$ $3x = 2$ $\therefore x = \frac{2}{3}$	<ul style="list-style-type: none"> <li>✓ common/gemene factor</li> <li>✓ simplification/vereenv.</li> <li>✓ equating/gelykst exponents</li> <li>✓ answer/antw. (4)</li> </ul>
1.1.5	$\sqrt{x-1} + 3 = x - 4$ $\sqrt{x-1} = x - 4 - 3$ $x - 1 = (x - 7)^2$ $x - 1 = x^2 - 14x + 49$ $x^2 - 15x + 50 = 0$ $(x - 5)(x - 10) = 0$ $x \neq 5 \text{ or } x = 10$	<ul style="list-style-type: none"> <li>✓ isolate/soleer <math>\sqrt{\text{sign/teken}}</math></li> <li>✓ squaring/kwadr both sides</li> <li>✓ std vorm/stand vorm</li> <li>✓ factors/fakt</li> <li>✓ <math>x \neq 5</math></li> <li>✓ <math>x = 10</math> (6)</li> </ul>
1.2	$3x - y + 2 = 0 \quad \text{and} \quad y = -x^2 + 2x + 8$ $\therefore y = 3x + 2 \quad \text{OR}$ $3x + 2 = -x^2 + 2x + 8 \quad 3x - (-x^2 + 2x + 8) + 2 = 0$ $x^2 + x - 6 = 0$ $(x + 3)(x - 2) = 0$ $x = -3 \text{ or } x = 2$ $y = 3(-3) + 2 \quad \text{or} \quad y = 3(2) + 2$ $= -7 \quad \text{or} \quad y = 8$	<ul style="list-style-type: none"> <li>✓ <math>y = 3x + 2</math></li> <li>✓ substitution/vervanging</li> <li>✓ std form/stand vorm</li> <li>✓ factors/faktore</li> <li>✓ x-values/x-waardes</li> <li>✓ y-values/y-waardes (6)</li> </ul>
1.3	$3x^2 + (k + 2)x - 1 - k = 0$ $3x^2 + (k + 2)x - 1 + k = 0$ $\Delta = b^2 - 4ac$ $= (k + 2)^2 - 4(3)(-1 + k)$ $= k^2 + 4k + 4 + 12 - 12k$ $= k^2 - 8k + 16$ $= (k - 4)^2$ $\therefore b^2 - 4ac \text{ is a perfect square.}$ <p>Roots are real and rational.</p>	<ul style="list-style-type: none"> <li>✓ <math>\Delta = b^2 - 4ac</math></li> <li>✓ substitution /vervanging</li> <li>✓ <math>k^2 - 8k + 16</math></li> <li>✓ <math>(k - 4)^2</math> (4)</li> </ul> <p>[30]</p>



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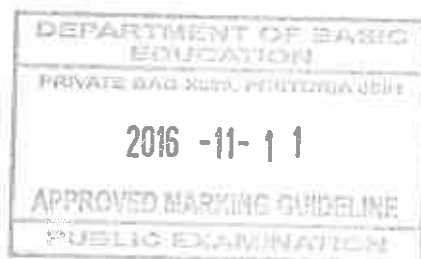
**QUESTION/VRAAG 2**

<p>2.1.1</p>	$\frac{5^a \cdot 5^{-2} \cdot 2^a \cdot 2^2}{10^a - 10^a \cdot 10^{-1} \cdot 2}$ $= \frac{(5 \cdot 2)^a \cdot 5^{-2} \cdot 2^2}{10^a \left[ 1 - \frac{2}{10} \right]}$ $= \frac{10^a \cdot \frac{4}{25}}{10^a \cdot \frac{8}{10}}$ $= \frac{4}{25} \times \frac{10}{8}$ $= \frac{1}{5}$	<p>✓ writing as separate bases/ <i>skryf as priembasisse</i></p> <p>✓ multiplication of bases with same exponents/<i>vermenigv. van basisse met dies. eksp.</i></p> <p>✓ common factor in the denominator/<i>gemene faktor in die noemer</i></p> <p>✓ simplification/<i>vereenv.</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(5)</p>
<p>2.1.2</p>	$\frac{\sqrt{27m^6} - \sqrt{48m^6}}{\sqrt{12m^6}}$ $= \frac{3\sqrt{3}m^3 - 4\sqrt{3}m^3}{2\sqrt{3}m^3}$ $= \frac{\sqrt{3}m^3(3-4)}{2\sqrt{3}m^3}$ $= \frac{-\sqrt{3}m^3}{2\sqrt{3}m^3}$ $= -\frac{1}{2}$ <p><b>OR/OF</b></p> $= \frac{3\sqrt{3m^6} - 4\sqrt{3m^6}}{2\sqrt{3m^6}}$ $= \frac{\sqrt{3m^6}(3-4)}{2\sqrt{3m^6}}$ $= \frac{3-4}{2}$ $= -\frac{1}{2}$	<p>✓ simplification of all surds/<i>vereenv. van alle wortelvorme</i></p> <p>✓ simplification numerator/<i>vereenv. van teller</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3)</p> <p>✓ simplification of all surds/<i>vereenv. van alle wortelvorme</i></p> <p>✓ simplification of numerator/<i>vereenv. van teller</i></p> <p>✓ answer/<i>antw.</i></p> <p style="text-align: right;">(3)</p>



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<p>2.2</p>	$\begin{aligned} \text{LHS} &= \frac{4\sqrt{2} - 8(1 + \sqrt{2})}{2\sqrt{2}(1 + \sqrt{2})} \\ &= \frac{-4\sqrt{2} - 8}{2\sqrt{2}(1 + \sqrt{2})} \\ &= \frac{-4(\sqrt{2} + 2)}{2(\sqrt{2} + 2)} \\ &= -2 \\ &= \text{RHS} \end{aligned}$ <p><b>OR/OF</b></p> $\begin{aligned} \text{LHS} &= \frac{2}{1 + \sqrt{2}} \times \frac{1 - \sqrt{2}}{1 - \sqrt{2}} = \frac{8 \times \sqrt{8}}{\sqrt{8} \times \sqrt{8}} \\ &= \frac{2 - 2\sqrt{2}}{1 - 2} - \sqrt{8} \\ &= -2 + 2\sqrt{2} - 2\sqrt{2} \\ &= -2 \\ &= \text{RHS} \end{aligned}$	<p>✓ LCD/KGV</p> <p>✓ numerator/teller</p> <p>✓ simplification/ vereenv.</p> <p>✓ common factor/gemene faktor</p> <p>(4)</p> <p>✓✓ rationalise the denominator of both fractions/rasionaliseer die noemer van beide breuke</p> <p>✓ <math>-2 + 2\sqrt{2}</math></p> <p>✓ <math>-2\sqrt{2}</math></p> <p>(4)</p> <p>[12]</p>
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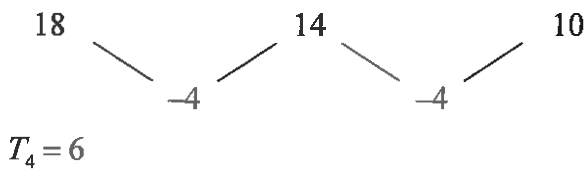
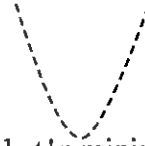


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QUESTION/VRAAG 3

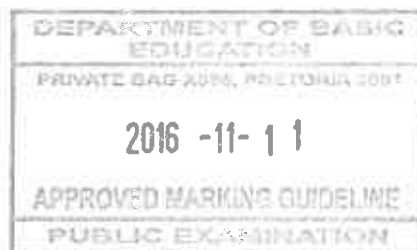
<p>3.1</p>	<p><math>x - 23 = 4</math> <math>x = 27</math></p>	<p>✓ answer/antw. (1)</p>
<p>3.2</p>	<p><math>2a = 4</math> <math>a = 2</math> <math>3a + b = 3</math> <math>6 + b = 3</math> <math>b = -3</math> <math>a + b + c = -9</math> <math>2 - 3 + c = -9</math> <math>c = -8</math> <math>T_n = 2n^2 - 3n - 8</math></p>	<p>✓ <math>a = 2</math> ✓ <math>b = -3</math> ✓ <math>c = -8</math> ✓ <math>T_n = 2n^2 - 3n - 8</math> (4)</p>
<p>3.3</p>	<p><math>T_n = 2n^2 - 3n - 8 + 3</math> <math>= 2n^2 - 3n - 5</math></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: auto; margin-right: auto;">CA from 3.2</div>	<p>✓ answer/antw. (1)</p>
<p>3.4</p>	<p><math>T_n = 400</math> <math>2n^2 - 3n - 5 = 400</math> <math>2n^2 - 3n - 405 = 0</math> <math>(n - 15)(2n + 27) = 0</math> <math>n = 15</math> or <math>n \neq \frac{-27}{2}</math></p> <p>OR</p> <p><math>2n^2 - 3n - 8 + 3 = 400</math> <math>2n^2 - 3n - 8 = 397</math> <math>2n^2 - 3n - 405 = 0</math> <math>(n - 5)(2n + 27) = 0</math> <math>n = 15</math> or <math>n \neq \frac{27}{2}</math></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: auto; margin-right: auto;">CA from 3.3</div>	<p>✓ equating/verg. ✓ std form/stand vorm ✓ factorisation/fakt. ✓ <math>n = 15</math> (4) ✓ equating/verg. ✓ std form/stand vorm ✓ factorisation/fakt. ✓ only/ slegs <math>n = 15</math> (4) [10]</p>

**QUESTION/VRAAG 4**

<p>4.1.1</p>		<p>✓ answer/antw. (1)</p>
<p>4.1.2</p>	$T_n = a + (n-1)d$ $= 18 + (n-1)(-4)$ $= -4n + 22$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 200px;">                 Answer only, full marks/slegs antwoord volpunte             </div>	<p>✓ substitution/verv. ✓ answer/antw. (2)</p>
<p>4.1.3</p>	$T_n = 22 - 4n$ $-70 = 22 - 4n$ $-92 = -4n$ $n = 23$	<p>✓ substitution/verv. ✓ answer/antw. (2)</p>
<p>4.1.4</p>	$Q_{510} - Q_{509} = T_{509}$ of the linear sequence $= 22 - 4 \times 509$ $= -2014$	<p>✓ making association/ass. ✓ answer/antw. (2)</p>
<p>4.2.1</p>	$2a = 2$ $\therefore a = 1$ $\therefore a > 0$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 20px;"> <math>T_n = an^2 + bn + c</math> </div>  <p>∴ this pattern has a minimum value/hierdie patroon het 'n minimum waarde The shape of the graph will be concave up / die vorm van die grafiek is konkaaf na bo</p>	<p>✓ value/wrde of a ✓ a &gt; 0 ✓ minimum value/wrde (3)</p>
<p>4.2.2</p>	$T_5 = 29$ $\therefore 1(5)^2 + 5b + c = 29$ ie $5b + c = 4 \dots (1)$ and $T_{17} = 29$ $\therefore 1(17)^2 + 17b + c = 29$ ie $17b + c = -260 \dots (2)$ solve the equations simultaneously $-12b = 264$ $\therefore b = -22$ substitute in (1) ie $5(-22) + c = 4$ $-110 + c = 4$ $\therefore c = 114$ $\therefore T_n = n^2 - 22n + 114$ <p><b>OR/OF</b></p>	<p>(5)</p> <p>✓ equations/verg. (1) &amp; (2)</p> <p>✓ value of/waarde van b</p> <p>✓ value of/waarde van c</p> <p>✓ answer/antwoord.</p>



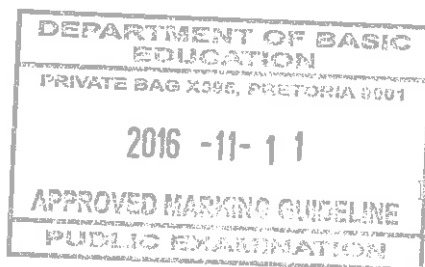
$T_n = 1(n + p)^2 + q$ $\text{A.O.S} = \frac{5+17}{2}$ $p = 11$ $\therefore T_n = 1(n - 11)^2 + q$ $29 = 1(17 - 11)^2 + q$ $\therefore q = -7$ $\therefore T_n = (n - 11)^2 - 7$ $T_n = n^2 - 22n + 114$	<ul style="list-style-type: none"> <li>✓ axis of symmetry/symm. as</li> <li>✓ value of/waarde van <math>p</math></li> <li>✓ substitution/verv. (17 ; 29) or/of (5 ; 29)</li> <li>✓ value of/waarde van <math>q</math></li> <li>✓ answer/antw.</li> </ul> <p style="text-align: right;"><b>[15]</b></p>
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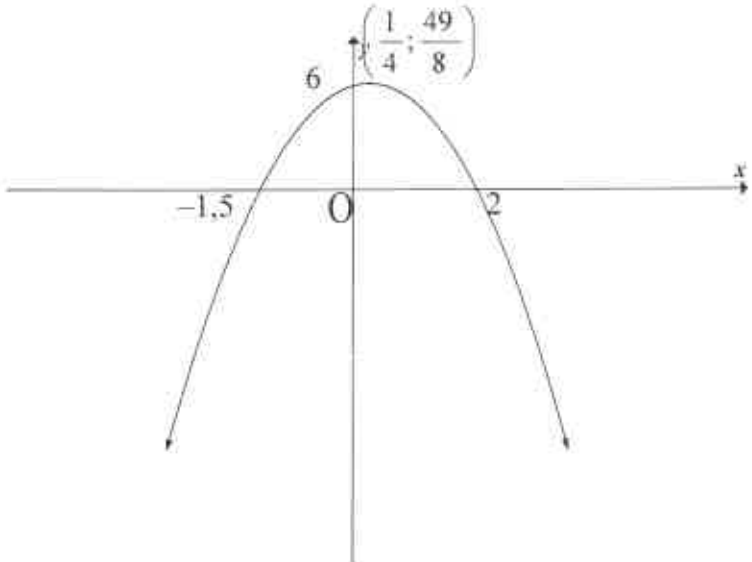
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**QUESTION 5**

<p>5.1</p>	$x = -\frac{b}{2a}$ $= -\frac{1}{2(-2)}$ $= \frac{1}{4}$ $\therefore y = -2\left(\frac{1}{4}\right)^2 + \left(\frac{1}{4}\right) + 6$ $y = \frac{49}{8}$ <p>OR</p> $f(x) = -2x^2 + x + 6$ $-2x^2 + x + 6 = 0$ $(2x + 3)(x - 2) = 0$ $x = \frac{-3}{2} \text{ or}$ $x = 2$ <p>x-value of the axis of symmetry</p> $x = -\frac{\frac{3}{2}}{2} + 2 = \left(\frac{1}{4}\right)$ $f\left(\frac{1}{4}\right) = -2\left(\frac{1}{4}\right)^2 + \frac{1}{4} + 6$ $= \frac{49}{8}$ <p>OR</p> $f(x) = -2\left(x^2 - \frac{x}{2}\right) + 6$ $= -2\left(x^2 - \frac{x}{2} + \left(-\frac{1}{4}\right)^2\right) + 6 - 2(-2)\left(-\frac{1}{4}\right)^2$ $= -2\left(x - \frac{1}{4}\right)^2 + \frac{49}{8}$ $TP = \left(\frac{1}{4}; \frac{49}{8}\right)$	<p>✓ substitution/verv.</p> <p>✓ x-value/waarde</p> <p>✓ substitution/verv.</p> <p>✓ y-value/waarde</p> <p>(4)</p>
<p>5.2</p>	$y = -2(0)^2 + 0 + 6$ $\therefore \text{y intercept } (0;6)$	<p>✓ y-value/waarde</p> <p>(1)</p>

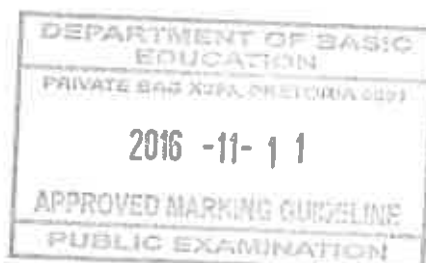


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<p>5.3</p>	<p><math>x</math> intercepts  <math>0 = -2x^2 + x + 6</math>  <math>0 = 2x^2 - x - 6</math>  <math>0 = (2x + 3)(x - 2)</math>  <math>\therefore x = 2</math> or <math>x = -\frac{3}{2}</math>  <math>(2;0)</math> and <math>(-\frac{3}{2};0)</math></p>	<p>✓ <math>y = 0</math>                   ✓ factorisation/faktorisering.                   ✓ ✓ <math>x</math>-values/waardes</p> <p>(4)</p>
<p>5.4</p>		<p>✓ shape/vorm                  ✓ <math>x</math>- intercepts/<math>x</math>-afsnitte                  ✓ turning point/draaipunt</p> <p>(3)</p>
<p>5.5</p>	<p><math>k = \frac{49}{8}</math></p>	<p>✓ ✓ answer/antwoorde.                  (2)</p>
<p>5.6</p>	<p>New/Nuwe turning point/drpn.t <math>(\frac{9}{4}; \frac{57}{8})</math>                  Equation/verg. of <math>h</math>  <math>y = -2(x - \frac{9}{4})^2 + \frac{57}{8}</math></p>	<p>✓ ✓ turning points/draaipunt                  ✓ equation/verg. (3)                  OR/OF                  ✓ ✓ ✓ answer only (3)                  [17]</p>

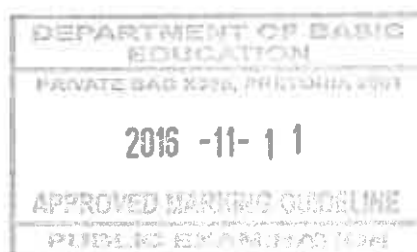
**QUESTION/VRAAG 6**

<p>6.1</p>	<p><math>x = -3</math> and <math>y = -1</math></p>	<p>✓ <math>x = -3</math>                  ✓ <math>y = -1</math></p> <p>(2)</p>
<p>6.2</p>	<p><math>x \in R; x \neq -3</math>                  OR  <math>x \in (-\infty; -3) \cup (-3; \infty)</math></p>	<p>✓ ✓ answer/antwoord.                  (2)</p>



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6.3.1	<p>At B, <math>x = 0</math></p> $\therefore y = \frac{1}{0+3} - 1$ $y = -\frac{2}{3}$ $\therefore OB = \frac{2}{3} \text{ units}$	<p>✓ substituton/vervanging. ✓ answer/antwoord.</p> <p>(2)</p>
6.3.2	<p>At A, <math>y = 0</math></p> $0 = \frac{1}{x+3} - 1$ $1 = \frac{1}{x+3}$ $x+3 = 1$ $x = -2$ $\therefore OA = 2 \text{ units/ eenhede}$	<p>✓ substitution/vervanging.</p> <p>✓ simplification/vereenv.</p> <p>✓ answer/antwoorde.</p> <p>(3)</p>
6.4	$\frac{1}{x+3} - 1 = \frac{1}{2}x$ $2 - 2(x+3) = x(x+3)$ $x^2 + 3x - 2 + 2x + 6 = 0$ $x^2 + 5x + 4 = 0$ $(x+4)(x+1) = 0$ $x = -4 \text{ or / of } x = -1$ <p>when / wanneer <math>x = -1</math>; <math>y = -\frac{1}{2}</math></p> <p>when / wanneer <math>x = -4</math>; <math>y = -2</math></p> $\therefore C \left(-1; -\frac{1}{2}\right) \text{ and } D (-4; -2)$	<p>✓ equating the two equations/ verg. van 2 vergelykings</p> <p>✓ standard form/std vorm</p> <p>✓ factors/faktore.</p> <p>✓ x-values/waardes</p> <p>✓ co-ordinates/koördinate C ✓ co-ordinates/ koördinate D</p> <p>(6)</p>

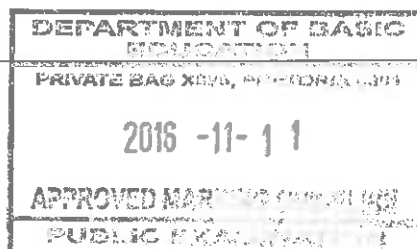


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6.5	$\frac{1}{x+3} \geq \frac{x+2}{2}$ $\frac{1}{x+3} \geq \frac{x}{2} + 1$ $\frac{1}{x+3} - 1 \geq \frac{x}{2}$ $\therefore f(x) \geq g(x)$ $\therefore x \leq -4 \text{ or } -3 < x \leq -1$	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">                     Answer only, full marks/ slegs antwoord volpunte                 </div> ✓ simplification/ vereenvoudig  ✓ $f(x) \geq g(x)$ ✓ $x \leq -4$ ✓ $-3 < x \leq -1$
		(4) [19]

**QUESTION/VRAAG 7**

7.1	$q = 2$ $f(x) = 2 \cdot b^{x+1} + 2$ $20 = 2 \cdot b^{1+1} + 2$ $18 = 2 \cdot b^2$ $9 = b^2$ $b = 3$ $f(x) = 2 \cdot 3^{x+1} + 2$	✓ substitution of / vervangings van $q = 2$  ✓ substitution of / vervangings van $(1;20)$  ✓ $b^2 = 9$
		(3)
7.2	$y = 2 \cdot 3^{-1+1} + 2$ $y = 2 \cdot 1 + 2$ $y = 4$	✓ answer/antwoord.
		(1)
7.3	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{20 - 4}{1 - (-1)}$ $= 8$	✓ substitution/vervangings.  ✓ answer/antwoord.
		(2)
7.4	$h(x) = -2 \cdot 3^{x+1} + 2$  <b>OR/OF</b> Reflected about the $x$ -axis/ refleksie om die $x$ -as $= -2 \cdot 3^{x+1} - 2$ $\therefore$ Reflected about the asymptote $h(x) = -2 \cdot 3^{x+1} - 2 + 4$ $= -2 \cdot 3^{x+1} + 2$	✓ ✓ answer/antwoord.  <b>OR/OF</b> ✓ reflection about $x$ -axis/ refleksie om die $x$ -as  ✓ answer/antwoord.
		(2)
7.5	$y < 2$	✓ answer/antwoord.
		(1)

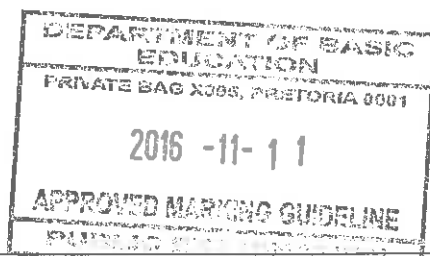


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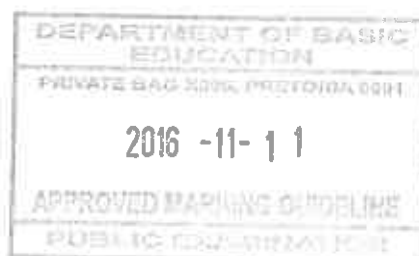
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**QUESTION/VRAAG 8**

<p>8.1</p>	$A = P(1-i)^n$ $= R25\,000 (1-0,09)^4$ $= R17\,143,74$	<p>✓ <math>A = P(1-i)^n</math>                  ✓ substitution/verv.                  ✓ answer/antw. (3)</p>
<p>8.2</p>	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m$ $1 + i_{eff} = \left(1 + \frac{0,1235}{12}\right)^{12}$ $i_{eff} = \left(1 + \frac{0,1235}{12}\right)^{12} - 1$ <p>∴ Rate = <math>0,13073 \times 100</math>                  = 13,07%</p> <p>The effective interest rate/Die effektiewe rentekoers is 13.07%</p>	<p>✓ formula/formule.                  ✓ substitution//vervanging.                  ✓ simplification/vereenv.                  ✓ answer/antwoord. (4)</p>
<p>8.3</p>	$A = P(1+i)^n$ $R\,221\,292,32 = R145\,000 \left(1 + \frac{r}{100}\right)^6$ $\sqrt[6]{\frac{R\,221\,292,32}{145\,000}} = 1 + \frac{r}{100}$ $\frac{r}{100} = 0,07300000324$ $r = 7,3\%$	<p>✓ correct substitution into correct formula/ korrekte vervanging in korrekte formule                  ✓ <math>n = 6</math>                  ✓ <math>\sqrt[6]{\frac{R\,221\,292,32}{145\,000}} = 1 + \frac{r}{100}</math>                  ✓ answer/antw. (4)</p>
<p>8.4</p>	$A = 15\,000 \left(1 + \frac{0,096}{4}\right)^{12} - 5\,000 \left(1 + \frac{0,096}{4}\right)^{10} + 3\,500 \left(1 + \frac{0,096}{4}\right)^4$ $= R17\,448,46$	<p>✓ <math>\frac{0,096}{4}</math>                  ✓ <math>15\,000 \left(1 + \frac{0,096}{4}\right)^{12}</math>                  ✓ <math>- 5\,000 \left(1 + \frac{0,096}{4}\right)^{10}</math>                  ✓ <math>3\,500 \left(1 + \frac{0,096}{4}\right)^4</math>                  ✓ answer/antw. (5)</p>

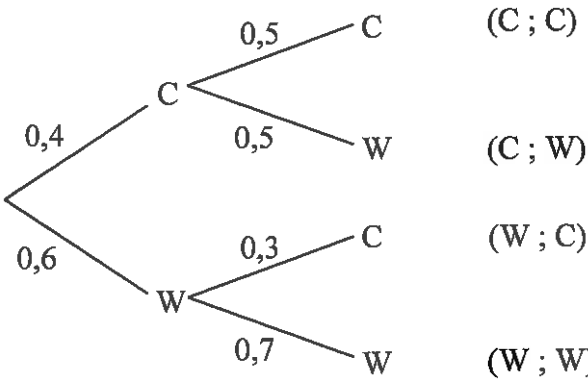


<p><b>OR</b></p> <p><math>T_0</math> to <math>T_{\frac{1}{2}}</math>,</p> $A = 15000 \left( 1 + \frac{0.069}{4} \right)^{4 \times \frac{1}{2}}$ $= R15728,64$ <p>A at <math>T_{\frac{1}{2}} = R15728,64 - R5000</math></p> $= R 10728,64$ <p><math>T_{\frac{1}{2}}</math> to <math>T_2</math>,</p> $A = R10728,64 \left( 1 + \frac{0.096}{4} \right)^{\frac{3}{2} \times 4}$ $= R12369,28$ <p>A at <math>T_2 = R12369,28 + R3500</math></p> $= R15869,28$ <p><math>T_2</math> to <math>T_3 = R15869,28 \left( 1 + \frac{0.096}{4} \right)^{4 \times 1}</math></p> $= R 17448,46$	<p>✓ <math>\frac{0,096}{4}</math></p> <p>✓ R10728,64</p> <p>✓ R12369,28</p> <p>✓ R15869,28</p> <p>✓ R 17448,46 (5)</p> <p>[16]</p>
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**QUESTION/VRAAG 9**

<p>9.1</p> <p>9.1.1</p>	<p>Given/Gegee: <math>P(A) = 0,2</math>  <math>P(B) = 0,5</math>  <math>P(A \text{ or } B) = 0,6</math></p> <p><math>P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)</math></p> <p><math>0,6 = 0,2 + 0,5 - P(A \text{ and } B)</math></p> <p><math>P(A \text{ and } B) = 0,1</math></p>	<p><math>\checkmark 0,6 = 0,2 + 0,5 - P(A \text{ and } B)</math></p> <p><math>\checkmark P(A \text{ and } B) = 0,1</math></p> <p>(2)</p>
<p>9.1.2</p>	<p><math>P(A \text{ and } B) = 0,1</math></p> <p><math>P(A) \times P(B) = 0,2 \times 0,5</math></p> <p><math>= 0,1</math></p> <p><math>\therefore P(A \text{ and } B) = P(A) \times P(B)</math></p> <p><math>\therefore A \text{ and } B \text{ are independent/ } A \text{ en } B \text{ is onafhanklik}</math></p>	<p><math>\checkmark P(A) \times P(B) = 0,1</math></p> <p><math>\checkmark P(A \text{ and } B) = P(A) \times P(B)</math></p> <p><math>\checkmark \text{ conclusion/gevolgtrekking}</math></p> <p>(3)</p>
<p>9.2.1</p>	<p><math>a = 15</math>  <math>b = 1</math>  <math>c = 38</math>  <math>d = 3</math>  <math>e = 37</math></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>CA must be applied if the values of a and b are calculated incorrectly / CA moet toegepas word as die waardes van a en b verkeerd bereken is</p> </div>	<p><math>\checkmark a = 15</math>  <math>\checkmark b = 1</math>  <math>\checkmark c = 38</math>  <math>\checkmark d = 3</math>  <math>\checkmark e = 37</math></p> <p>(5)</p>
<p>9.2.2</p>	<p><math>P(\text{one learner plays netball or volleyball}) = \frac{25}{100} = \frac{1}{4}</math></p>	<p><math>\checkmark 25</math>  <math>\checkmark \text{ answer/antwoord}</math></p> <p>(2)</p>
<p>9.3.1</p>		<p><math>\checkmark \text{ branch at first level with probabilities/ eerste vertakking met waarskynlikhede}</math></p> <p><math>\checkmark \text{ branches at second level with probabilities/ tweede vertakkings met waarskynlikhede}</math></p> <p><math>\checkmark \text{ outcomes/uitkomst}</math></p> <p>(3)</p>

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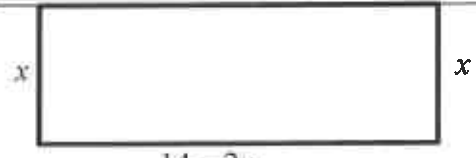
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 PUBLIC EXAMINATION

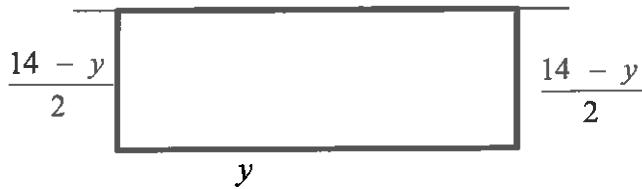


9.3.2	$P(\text{second answer correct}) = P(C \text{ and } C) + P(W \text{ and } C)$ $= (0,4 \times 0,5) + (0,6 \times 0,3)$ $= 0,38$	✓ addition of probabilities/ <i>som van waarskynlikhede</i> ✓ substitution/vervanging ✓ answer/antwoord. (3) [18]
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**QUESTION/VRAAG 10**

10	<div style="text-align: center;">  </div> <p>Let one of the equal sides = <math>x</math> / <i>Laat een van die sye = <math>x</math></i></p> <p>the other side = <math>14 - 2x</math> / <i>die ander sy = <math>14 - 2x</math></i></p> $\text{Area} = (14 - 2x)x$ $= -2x^2 + 14x$ $x = \frac{-14}{2(-2)}$ $= \frac{7}{2}m$ $y = 7m$ <p><b>OR/OF</b></p> <p><math>\therefore</math> the other side = <math>14 - 2x</math> / <i>die ander sy = <math>14 - 2x</math></i></p> <p><math>\therefore</math> Area = <math>(14 - 2x)x</math></p> $= -2(x^2 - 7x)$ $= -2\left(x^2 - 7x + \frac{49}{4} - \frac{49}{4}\right)$ $= -2\left[\left(x - \frac{7}{2}\right)^2 - \frac{49}{4}\right]$ $= -2\left(x - \frac{7}{2}\right)^2 + \frac{49}{2}$ <p><math>\therefore</math> when <math>x = \frac{7}{2}</math> metres it will have a maximum area</p> <p><math>\therefore</math> the other side = <math>14 - 2\left(\frac{7}{2}\right)</math></p> $= 7 \text{ metres}$ <p><b>OR/OF</b></p>	✓ area formula/ <i>oppervl.for.</i> $x = \frac{-14}{2(-2)}$ ✓ answer for/ <i>antwoord van <math>x</math></i> ✓ answer for / <i>antwoord van <math>y</math></i> (4)
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Let the length be  $y$

Width be  $\frac{14-y}{2}$

$$\text{Area} = y\left(7 - \frac{1}{2}y\right)$$

$$= \frac{-1}{2}y^2 + 7y$$

$$y = \frac{-7}{2\left(\frac{-1}{2}\right)}$$

$$= 7m$$

$$\text{width} = 3,5m$$

**OR**

$$\text{Area} = y\left(7 - \frac{1}{2}y\right)$$

$$= \frac{-1}{2}y^2 + 7y$$

$$= \frac{-1}{2}(y^2 - 14y)$$

$$= \frac{-1}{2}(y-7)^2 + \frac{49}{2}$$

$$\text{length} = 7m$$

$$\text{width} = 3,5m$$

✓ area formula/oppervl.for.

$$y = \frac{-7}{2\left(\frac{-1}{2}\right)}$$

✓ answer for  $y$   
 ✓ answer for width/  
 antwoord van breedte

(4)

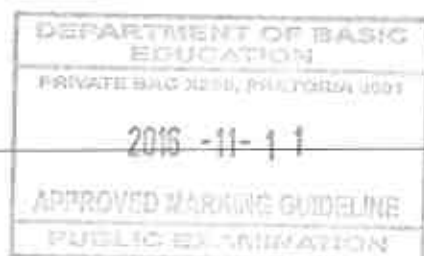
✓ area formula/oppervl.for.

✓ completing the square/  
 voltooiing van die vierkant

✓ answer for /antwoord van  $y$   
 ✓ answer for width/  
 antwoord van breedte

(4)

[4]



TOTAL/TOTAAL: Dm 150