



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIOR SERTIFIKAAT**

**GRADE/*GRAAD* 10**

**NOVEMBER 2019**

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

**MARKS/*PUNTE*: 100**

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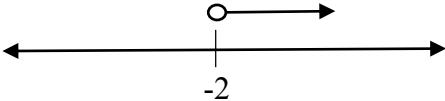
This marking guideline consists of 9 pages./  
*Hierdie nasienriglyn bestaan uit 9 bladsye.*

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QUESTION/VRAAG 1																																			
Ques./ Vraag	SOLUTION/OPLOSSING	EXPLANATION/ VERDUIDELIKING																																	
1.1	$\sqrt{49} < \sqrt{62} < \sqrt{64}$ $\sqrt{62}$ lies between / lê tussen 7 and/en 8	✓ method / metode ✓ answer / antwoord	(2)																																
1.2	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>2</td><td>72</td><td></td><td></td></tr> <tr><td>2</td><td>36</td><td>r</td><td>0</td></tr> <tr><td>2</td><td>18</td><td>r</td><td>0</td></tr> <tr><td>2</td><td>9</td><td>r</td><td>0</td></tr> <tr><td>2</td><td>4</td><td>r</td><td>1</td></tr> <tr><td>2</td><td>2</td><td>r</td><td>0</td></tr> <tr><td>2</td><td>1</td><td>r</td><td>0</td></tr> <tr><td></td><td>0</td><td>r</td><td>1</td></tr> </table> $\therefore 72_{10} = 1001000_2$	2	72			2	36	r	0	2	18	r	0	2	9	r	0	2	4	r	1	2	2	r	0	2	1	r	0		0	r	1	✓ method / metode ✓ answer / antwoord  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">             No mark awarded for answer if base NOT indicated/Geen punt toegeken vir antwoord as basis NIE aangedui is NIE.           </div>	(2)
2	72																																		
2	36	r	0																																
2	18	r	0																																
2	9	r	0																																
2	4	r	1																																
2	2	r	0																																
2	1	r	0																																
	0	r	1																																
1.3	$\begin{array}{r} 1110_2 \\ \times 111_2 \\ \hline 1110_2 \\ 11100_2 \\ 111000_2 \\ \hline 1100010_2 \end{array}$	✓ method / metode ✓ answer / antwoord	(2)																																
1.4	$8,72 \times 10^{-4}$	✓ answer / antwoord	(1)																																
1.5	$5(-3)^2 + 3(-3)(2) - 2(2)^2 = 19$	✓ substitution / vervanging ✓ answer / antwoord	(2)																																
			<b>[9]</b>																																

QUESTION/VRAAG 2				
Ques./ Vraag	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
2.1	2.1.1	$5(7x-5y)^2$ $= 5(49x^2 - 70xy + 25y^2)$ $= 245x^2 - 350xy + 125y^2$	<ul style="list-style-type: none"> <li>✓ <math>49x^2</math></li> <li>✓ <math>-70xy</math></li> <li>✓ <math>25y^2</math></li> <li>✓ answer simplified / <i>antwoord vereenvoudig</i></li> </ul>	(4)
	2.1.2	$(2a+3)(4a^2-6a+9)$ $= 8a^3 - 12a^2 + 18a + 12a^2 - 18a + 27$ $= 8a^3 + 27$	<ul style="list-style-type: none"> <li>✓ <math>8a^3</math></li> <li>✓ 27</li> </ul>	(2)
	2.1.3	$(3+4i)(-2-5i)$ $= -6 - 15i - 8i - 20i^2$ $= -6 - 23i - 20(-1)$ $= -6 - 23i + 20$ $= 14 - 23i$	<ul style="list-style-type: none"> <li>✓ expand / <i>uitbreiding</i></li> <li>✓ substitution / <i>vervanging -1</i></li> <li>✓ simplification / <i>vereenvoudiging</i></li> </ul>	(3)
2.2	2.2.1	$\frac{3^{x+1} \cdot 81^x}{9^{x+2}}$ $= \frac{3^{x+1} \cdot (3^4)^x}{(3^2)^{x+2}}$ $= \frac{3^{x+1} \cdot 3^{4x}}{3^{2x+4}}$ $= 3^{x+1+4x-2x-4}$ $= 3^{3x-3}$	<ul style="list-style-type: none"> <li>✓ definition <math>3^4</math> and/en <math>3^2</math></li> <li>✓ power law / <i>magswet</i></li> <li>✓ division law / <i>delingswet</i></li> <li>✓ answer / <i>antwoord</i></li> </ul>	(4)
	2.2.2	$\frac{(9x^2)^4 \times 3x^2}{27}$ $= \frac{6561x^8 \times 3x^2}{27}$ $= \frac{19683x^{10}}{27}$ $= 729x^{10}$	<ul style="list-style-type: none"> <li>✓ power law / <i>magswet</i></li> <li>✓ simplification / <i>vereenvoudiging</i></li> <li>✓ answer / <i>antwoord</i></li> </ul>	(3)
			[16]	

QUESTION/VRAAG 3			
Ques./ Vraag	SOLUTION/OPLOSSING	EXPLANATION/ VERDUIDELIKING	
3.1	$x^2 + 5x - 6$ $= (x + 6)(x - 1)$	✓ $(x + 6)$ ✓ $(x - 1)$	(2)
3.2	$-4a^3 + 32$ $= -4(a^3 - 8)$ $= -4(a - 2)(a^2 + 2a + 4)$	✓ $-4$ common factor / <i>gemene faktor</i> ✓ $(a - 2)$ ✓ $(a^2 + 2a + 4)$	(3)
3.3	$\frac{x^2(x+7) - 2x(x+7) + (x+7)}{(x+7)(x-1)^2}$ $= \frac{(x+7)(x^2 - 2x + 1)}{(x+7)(x-1)^2}$ $= \frac{(x-1)(x-1)}{(x-1)(x-1)}$ $= 1$	✓ $(x + 7)$ common factor / <i>gemene faktor</i> ✓ $(x^2 - 2x + 1)$ ✓ factorise/faktoriseer: $(x - 1)(x - 1)$ ✓ simplification / <i>vereenvoudiging</i>	(4)
			<b>[9]</b>

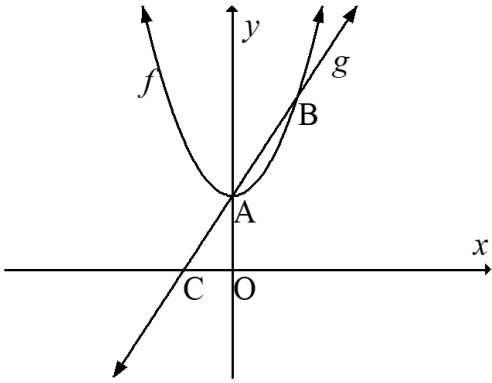
QUESTION/VRAAG 4			
Ques./ Vraag	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING
4.1	4.1.1	$9^{x-1} = 81$ $(3^2)^{x-1} = 3^4$ $3^{2x-2} = 3^4$ $\therefore 2x - 2 = 4$ $2x = 6$ $x = 3$	✓ $3^2$ and / en $3^4$ ✓ exponent law / eksponent wet ✓ exponents equal / eksponente gelyk ✓ answer / antwoord
	4.1.2	$(x + 5)(2x - 3) = 0$ $\therefore x = -5$ or / of $x = \frac{3}{2}$	✓ $-5$ ✓ $\frac{3}{2}$
	4.1.3	$\frac{2x + 16}{x} = 10$ $2x + 16 = 10x$ $16 = 8x$ $2 = x$	✓ $2x + 16 = 10x$ ✓ $16 = 8x$ ✓ answer / antwoord
4.2	$2(x + 4) > x + 6$ $2x + 8 > x + 6$ $x > -2$ 		✓ expand / uitbreiding ✓ answer / antwoord ✓ diagram / diagram
4.3	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $\frac{x^2}{a^2} = 1 - \frac{y^2}{b^2}$ $x^2 = \left(1 - \frac{y^2}{b^2}\right) \times a^2$ $x^2 = \frac{b^2 - y^2}{b^2} \times a^2$ $x^2 = \frac{a^2(b^2 - y^2)}{b^2}$ $x = \pm \frac{a}{b} \sqrt{b^2 - y^2}$		✓ $-\frac{y^2}{b^2}$ ✓ $\times a^2$ ✓ $\frac{a^2(b^2 - y^2)}{b^2}$ ✓ answer / antwoord
4.4	4.4.1	$P = 2(l + b)$ $30 = 2(2x + y)$ $P = 2(l + b)$ $24 = 2(x + y)$	✓ answer / antwoord  ✓ answer / antwoord

4.4.2	<p>Substitution/<i>Vervanging</i>  <math>30 = 2(2x + y) \dots \textcircled{1}</math>    <math>24 = 2(x + y) \dots \textcircled{2}</math>  <math>15 = 2x + y</math>  <math>15 - 2x = y \dots \textcircled{3}</math>  Sub/<i>Vervang</i> <math>\textcircled{3}</math> in <math>\textcircled{2}</math>:  <math>24 = 2(x + (15 - 2x))</math>  <math>24 = 2(x + 15 - 2x)</math>  <math>24 = 2(-x + 15)</math>  <math>12 = -x + 15</math>  <math>-3 = -x</math>  <math>3 = x</math>  Sub/<i>Vervang</i> <math>x = 3</math> in <math>\textcircled{3}</math>:  <math>15 - 2(3) = y</math>  <math>9 = y</math></p> <p style="text-align: center;"><b>OR/OF</b></p> <p>Elimination/<i>Eliminasie</i>:  <math>30 = 2(2x + y) \dots \textcircled{1}</math>    <math>24 = 2(x + y) \dots \textcircled{2}</math>  <math>30 = 4x + 2y \dots \textcircled{3}</math>    <math>24 = 2x + 2y \dots \textcircled{4}</math>  <math>\textcircled{3} - \textcircled{4}</math>:  <math>30 = 4x + 2y</math>  <math>24 = 2x + 2y</math>  <math>6 = 2x</math>  <math>3 = x</math>  Sub/<i>Vervang</i> <math>x = 3</math> in <math>\textcircled{3}</math>:  <math>30 = 4(3) + 2y</math>  <math>30 = 12 + 2y</math>  <math>18 = 2y</math>  <math>9 = y</math></p>	<p>✓ making <math>y</math> the subject /  <i>maak y die onderwerp</i>  ✓ substitution / <i>vervanging</i></p> <p>✓ expanding / <i>uitbreiding</i></p> <p>✓ answer for <math>x</math> / <i>antwoord vir x</i></p> <p>✓ answer for <math>y</math> / <i>antwoord vir y</i></p> <p style="text-align: center;"><b>OR / OF</b></p> <p>✓ expanding / <i>uitbreiding</i>  ✓ method / <i>metode</i></p> <p>✓ simplification /  <i>vereenvoudiging</i>  ✓ answer for <math>x</math> / <i>antwoord vir x</i></p> <p>✓ answer for <math>y</math> / <i>antwoord vir y</i></p>	(5)									
4.5	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Distance/<i>Afstand</i></th> <th style="width: 25%;">Speed/<i>Spoed</i></th> <th style="width: 25%;">Time/<i>Tyd</i></th> </tr> </thead> <tbody> <tr> <td><math>x</math></td> <td>120 km/h</td> <td><math>\frac{x}{120}</math></td> </tr> <tr> <td><math>x</math></td> <td>160 km/h</td> <td><math>\frac{x}{160}</math></td> </tr> </tbody> </table> <p><math>\therefore \frac{x}{120} - \frac{x}{160} = 2 \text{ hrs}</math>  <math>\times 480 : 4x - 3x = 960</math>  <math>x = 960 \text{ km}</math></p> <p><math>\therefore</math> Slower truck takes/<i>Stadiger tron neem</i>  <math>960 \div 120 = 8 \text{ hrs}</math></p>	Distance/ <i>Afstand</i>	Speed/ <i>Spoed</i>	Time/ <i>Tyd</i>	$x$	120 km/h	$\frac{x}{120}$	$x$	160 km/h	$\frac{x}{160}$	<p>✓ <math>\frac{x}{120}</math>  ✓ <math>\frac{x}{160}</math></p> <p>✓ equation for time /  <i>vergelyking vir tyd</i>  ✓ simplification /  <i>vereenvoudiging</i>  ✓ simplification /  <i>vereenvoudiging</i>  ✓ answer / <i>antwoord</i></p>	(6)
Distance/ <i>Afstand</i>	Speed/ <i>Spoed</i>	Time/ <i>Tyd</i>										
$x$	120 km/h	$\frac{x}{120}$										
$x$	160 km/h	$\frac{x}{160}$										
			<b>[29]</b>									

QUESTION/VRAAG 5				
Ques./ Vraag	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
5.1	5.1.1	Hairdryer cost / $Haardroër koste = £100 \times \frac{R17,58}{£1}$ $= R1\ 758$	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i>	(2)
	5.1.2	Hairdryer cost / $Haardroër koste = £100 \times \frac{R\ 15,00}{£1}$ $= R1\ 500$	✓ answer / <i>antwoord</i>	(1)
	5.1.3	Savings = $R1\ 758 - R1\ 500 = R258$	✓ answer / <i>antwoord</i>	(1)
5.2	5.2.1	Deposit / <i>deposito</i> = $R10\ 000 \times 12\%$ $= R1\ 200$	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i>	(2)
	5.2.2	$A = P(1 + in)$ $A = 8\ 800(1 + 25\%(5))$ $A = R19\ 800$ $\therefore Total = R19\ 800 + R1\ 200$ $= R21\ 000$	✓ substitution into correct formula / <i>vervanging in</i> <i>korrekte formule</i> ✓ R8 800 ✓ answer / <i>antwoord</i> ✓ answer / <i>antwoord</i>	(4)
	5.2.3	Monthly installment / <i>maandelikse betaling</i> $= R19\ 800 \div (5 \times 12)$ $= R330$	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i>	(2)
5.3	$A = P(1 + i)^n$ $A = R6\ 000(1 + 15\%)^5$ $A = R12\ 068,14$		✓ correct formula / <i>korrekte</i> <i>formule</i> ✓ substitution into correct formula / <i>vervanging in</i> <i>korrekte formule</i> ✓ answer / <i>antwoord</i>	(3)
				<b>[15]</b>

QUESTION/VRAAG 6																																								
Ques./ Vraag	SOLUTION/OPLOSSING								EXPLANATION/ VERDUIDELIKING																															
6.1.1	<table border="1"> <tr> <td><math>x</math></td> <td>-4</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td><math>h(x)</math></td> <td>-1</td> <td><math>\frac{4}{-3}</math></td> <td>-2</td> <td>-4</td> <td><math>\infty</math></td> <td>4</td> <td>2</td> <td><math>\frac{4}{3}</math></td> <td>1</td> </tr> <tr> <td><math>p(x)</math></td> <td><math>\frac{1}{81}</math></td> <td><math>\frac{1}{27}</math></td> <td><math>\frac{1}{9}</math></td> <td><math>\frac{1}{3}</math></td> <td>1</td> <td>3</td> <td>9</td> <td>27</td> <td>81</td> </tr> </table> <p> <math>h(x)</math>:            ✓ Correct values            ✓ Undefined value  <math>p(x)</math>:            ✓ Correct values         </p>								$x$	-4	-3	-2	-1	0	1	2	3	4	$h(x)$	-1	$\frac{4}{-3}$	-2	-4	$\infty$	4	2	$\frac{4}{3}$	1	$p(x)$	$\frac{1}{81}$	$\frac{1}{27}$	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9	27	81		(3)
$x$	-4	-3	-2	-1	0	1	2	3	4																															
$h(x)$	-1	$\frac{4}{-3}$	-2	-4	$\infty$	4	2	$\frac{4}{3}$	1																															
$p(x)$	$\frac{1}{81}$	$\frac{1}{27}$	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9	27	81																															
6.1.2									$h(x)$ : ✓ shape / vorm ✓ quadrants / kwadrante ✓ asymptotes / asymptote  $p(x)$ : ✓ shape / vorm ✓ y-intercept / y-afsnit	(5)																														



<p>6.2</p>			
	<p>A:  <math>f(x) = x^2 + 3</math>  <math>y = (0)^2 + 3</math>  <math>y = 3</math>  <math>\therefore A(0; 3)</math></p> <p>C:  <math>g(x) = 2x + 3</math>  <math>0 = 2x + 3</math>  <math>-3 = 2x</math>  <math>\frac{-3}{2} = x</math>  <math>\therefore C\left(\frac{-3}{2}; 0\right)</math></p> <p>B:  <math>f(x) = g(x)</math>  <math>x^2 + 3 = 2x + 3</math>  <math>x^2 - 2x + 3 - 3 = 0</math>  <math>x^2 - 2x = 0</math>  <math>x(x - 2) = 0</math>  <math>x = 0</math> or <math>x = 2</math>  <math>\therefore x = 2</math>  <math>y = 2(2) + 3</math>  <math>y = 7</math>  <math>\therefore B(2; 7)</math></p>	<p>✓ <math>x = 0</math>                  ✓ <math>A(0; 3)</math></p> <p>✓ <math>g(x) = 0</math></p> <p>✓ <math>C\left(\frac{-3}{2}; 0\right)</math></p> <p>✓ <math>f(x) = g(x)</math>                  ✓ standard form / <i>standaardvorm</i>                  ✓ <math>x = 2</math></p> <p>✓ <math>B(2; 7)</math></p>	<p>(8)</p>
<p>6.3.1</p>	<p><math>x \in \mathbb{R}</math></p>	<p>✓ answer / <i>antwoord</i></p>	<p>(1)</p>
<p>6.3.2</p>	<p><math>y \geq 3</math></p>	<p>✓ answer / <i>antwoord</i></p>	<p>(1)</p>
<p>6.4.1</p>	<p><math>x &gt; \frac{-3}{2}</math></p>	<p>✓ Inequality / <i>ongelykheid</i>                  ✓ Endpoint / <i>Eindpunt</i>                  From coordinates of C in <b>6.2.1</b>                  Vanaf koördinate van C in <b>6.2.1</b></p>	<p>(2)</p>
<p>6.4.2</p>	<p><math>x = 0</math> or/of <math>x = 2</math></p>	<p>From/<i>Vanaf</i> <b>6.2.1</b>                  ✓ Answer / <i>antwoord</i>                  ✓ Answer / <i>antwoord</i></p>	<p>(2)</p>
			<p>[22]</p>
<p style="text-align: right;"><b>TOTAL/TOTAAL:</b></p>			<p><b>100</b></p>