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GRADE/GRAAD 10

NOVEMBER 2018

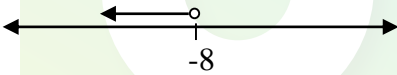
**TECHNICAL MATHEMATICS P1/TEGNIJSE WISKUNDE
VI
MARKING GUIDELINE/NASIEENRIGLYN**

MARKS/PUNTE: 100

This marking guideline consists of 8 pages./
Hierdie nasienriglyn bestaan uit 8 bladsye.

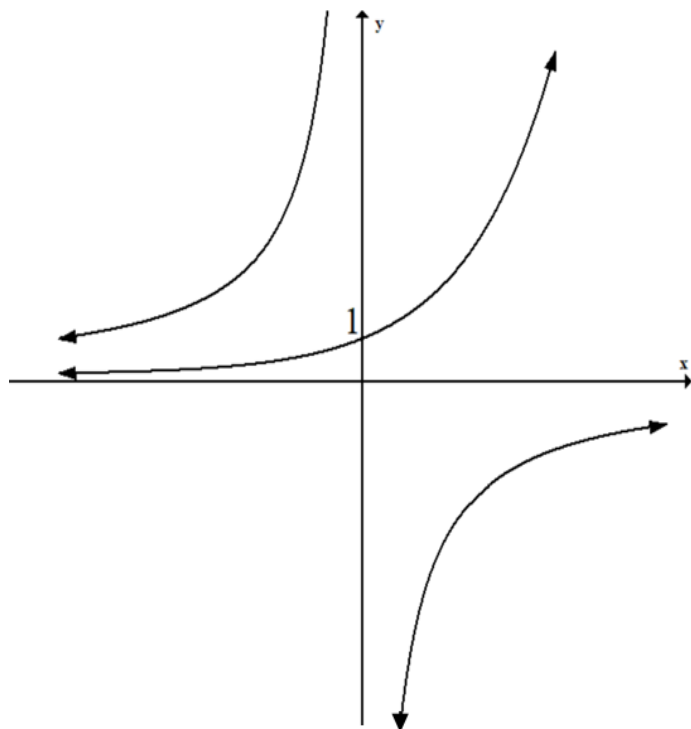
QUESTION/VRAAG 1				
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
1.1	1.1.1	$\sqrt[3]{9}$	✓ answer / antwoord	(1)
	1.1.2	$\sqrt{9}$	✓ answer / antwoord	(1)
1.2	$\sqrt{9} < \sqrt{11} < \sqrt{16}$		✓ 3	(2)
	$\sqrt{11}$ lies between / lê tussen 3 and/en 4		✓ 4	
1.3	$7x^2 - 2x - 6 - (3x^2 - 5x - 7)$ $= 7x^2 - 2x - 6 - 3x^2 + 5x + 7$ $= 4x^2 + 3x + 1$		✓ $-3x^2 + 5x + 7$ ✓ answer / antwoord	(2)
1.4	$ \begin{array}{r} 111_2 \\ 1001_2 \overline{)111111_2} \\ \underline{1001_2} \\ 1101_2 \\ \underline{1001_2} \\ 1001_2 \\ \underline{1001_2} \\ 0000 \end{array} $ Answer / Antwoord = $111_2 = 7$		✓ method / metode ✓ 111_2 ✓ 7	(3)
1.5	1.5.1	$2x^2 + 4x - 2x^2 + 3x + 3$ $= 7x + 3$	✓ $2x^2 + 4x$ ✓ $3x + 3$ ✓ answer / antwoord	(3)
	1.5.2	$a^3 + 3a^2 + 9a - 3a^2 - 9a - 27$ $= a^3 - 27$	✓ $a^3 + 3a^2 + 9a$ ✓ $-3a^2 - 9a - 27$ ✓ answer / antwoord	(3)
	1.5.3	$-2 + 6i - 3i + 9i^2$ $= -2 + 3i + 9(-1)$ $= -11 + 3i$	✓ product / produk ✓ $i^2 = -1$ ✓ answer / antwoord	(3)
				[18]

QUESTION/VRAAG 2				
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
2.1	2.1.1	$(x^2 + 9)(x^2 - 9) = (x^2 + 9)(x - 3)(x + 3)$	$\checkmark (x^2 + 9)(x^2 - 9)$ $\checkmark (x - 3)(x + 3)$	(2)
	2.1.2	$6x^2y - 10xy + 5x - 25$ $= (6x^2y - 10xy) + (5x - 25)$ $= 2xy(3x - 5) + 5(3x - 5)$ $= (3x - 5)(2xy + 5)$ OR / OF $(6x^2y + 15x) + (10xy - 25)$ $= 3x(2xy + 5) - 5(2xy + 5)$ $= (2xy + 5)(3x - 5)$	\checkmark grouping / groepering \checkmark HCF / HGF \checkmark factors / faktore	(3)
2.2	2.2.1	$\frac{3^{x+2} \cdot 27^{x-2}}{81^x}$ $= \frac{3^x \cdot 3^2 \cdot (3^3)^{x-2}}{(3^4)^x}$ $= 3^{x+2+3x-6-4x}$ $= 3^{-4}$ $= \frac{1}{3^4} = \frac{1}{81}$	$\checkmark 3^3$ and/en 3^4 \checkmark simplification / vereenvoudiging $\checkmark 3^{-4}$ \checkmark answer / antwoord	(4)
	2.2.2	$\frac{x^3+y^3}{2x^3-x^2y-3xy^2} \div \frac{x^3y-x^2y^2+xy^3}{4x^4-9x^2y^2}$ $= \frac{(x+y)(x^2-xy+y^2)}{x(2x-3y)(x+y)} \times \frac{x^2(2x-3y)(2x+3y)}{xy(x^2-xy+y^2)}$ $= \frac{2x+3y}{y}$	\checkmark factorising sum of two cubes <i>faktorisering van som van twee derdemagte</i> $\checkmark x(2x - 3y)(x + y)$ $\checkmark xy(x^2 - xy + y^2)$ $\checkmark x^2(2x - 3y)(2x + 3y)$ \checkmark answer / antwoord	(5)
				[14]

QUESTION/VRAAG 3				
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
3.1	3.1.1	$5^x = 5^{-3}$ $x = -3$	✓ 5^{-3} ✓ answer / <i>antwoord</i>	(2)
	3.1.2	$3x + 1 = 2x$ $3x - 2x = -1$ $x = -1$	✓ $2x$ ✓ $3x - 2x = -1$ ✓ answer / <i>antwoord</i>	(3)
	3.1.3	$x = -13$ or/of $x = 1$	✓ -13 ✓ 1	(2)
	3.1.4	$3x + 21 < \frac{x}{2} + 1$ $6x + 42 < x + 2$ $5x = -40$ $x < -8$ OR / OF $3x - \frac{x}{2} < 1 - 21$ $\frac{5x}{2} < -20$ $x < -8$ 	✓ $3x + 21$ ✓ $6x + 42 < x + 2$ ✓ answer / <i>antwoord</i> ✓ indicating numbers to the left of -8 and -8 not included / <i>Toon aan getalle links van -8 en -8 is nie ingesluit nie.</i>	(4)
				[11]

QUESTION/VRAAG 4			
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING
4.1	$1.675 \times 10^{-27} \text{ kg}$		✓✓ answer / antwoord (2)
4.2	$R = \sqrt{\frac{A}{\pi} + r^2}$		✓✓ answer / antwoord (2)
4.3	$S = vt$ Car/Kar $v = x + 5$ $S = (x + 5)4$ Truck/Trok $v = x$ $s = 4x$ $4(x + 5) + 4x = 380$ $x = 45$ Truck speed/Trokspoed = 45 km/h Car speed/Karspoed = 50 km/h		✓ $s = (x + 5)4$ ✓ $s = 4x$ ✓ $4(x + 5) + 4x = 380$ ✓ $x = 45$ ✓ car speed / kar speed ✓ truck speed / trok speed (6)
4.4	4.4.1	Floor plan-1/Vloerplan-1 $2(2x - 10) + 2(5 + y) = 70$ $4x - 20 + 10 + 2y = 70$ $y + 2x = 40 \dots\dots\dots(1)$ Floor plan-2/Vloerplan-2 $2(2x - 10) + 2[\frac{1}{2}(5 + y)] = 60$ $4x - 20 + 5 + y = 60$ $4x + y = 75 \dots\dots\dots(2)$	✓ sum of the lengths = 70 m som van die lengtes = 70 m ✓ $y + 2x = 40$ ✓ sum of the lengths = 60 m som van die lengtes = 60 m ✓ $4x - 2y = 75$ (4)

	4.4.2	<p>From equation (1) / <i>Vanaf vergelyking (1)</i> $y = 40 - 2x$(3) Substitute eq (3) in eq (2) / <i>Vervang verg.(3) in verg.(2)</i> $4x + (40 - 2x) = 75$ $2x = 35$ $\therefore x = \frac{35}{2} = 17,5$</p> <p>Substitute the value of x into(3)/<i>Vervang waarde van x in (3)</i> $y = 40 - 2\left(\frac{35}{2}\right)$ $y = 5$ OR / OF $2x + y = 40$ (1) $4x + y = 75$..... (2) $(2) - (1)$ $2x = 35$ $x = \frac{35}{2} = 17.5$ $y = 5$</p>	<p>✓ $y = 40 - 2x$ ✓ substitution / <i>vervanging</i></p> <p>✓ x-value / <i>x-waarde</i></p> <p>✓ y-value / <i>y-waarde</i></p>	(4)
				[18]
QUESTION/VRAAG 5				
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
5.1	5.1.1	<p>A (-2; 0) B (2; 0) C (0; 4) D (0; -2)</p>	<p>✓✓ (-2;0) ✓✓ (2;0) ✓✓ (0;4) ✓✓ (0;-2)</p>	(8)
	5.1.2	<p>$f(x) = g(x)$ $-x^2 + 4 = x - 2$ $x^2 + x - 6 = 0$ $(x + 3)(x - 2) = 0$ $x = -3$ or $x = 2$ $y = -3 - 2 = -5$ E(-3 - 5)</p>	<p>✓ equating the functions / <i>gelykstel van die funksies</i> ✓ standard form / <i>standaardvorm</i> ✓ factors / <i>faktore</i> ✓ x-values / <i>x-waardes</i> ✓ y-value / <i>y-waarde</i> ✓ coordinates of E / <i>koördinate van E</i></p>	(6)
	5.1.3	<p>CD = $OC + OD$ $= 4 + 2 = 6$ units / <i>eenhede</i></p>	<p>✓ $4 + 2$ ✓ answer / <i>antwoord</i></p>	(2)

5.2	5.2.1	$x \in R$	✓answer / <i>antwoord</i>	(1)
	5.2.2	$y \leq 4$ OR/OF y	✓answer / <i>antwoord</i>	(1)
5.3	$j(x) = -(x^2 + 4)$ $= x^2 - 4$		✓substitution / <i>vervanging</i> ✓answer / <i>antwoord</i>	(2)
5.4			✓shape of k / <i>vorm van k</i> ✓asymptotes of k / <i>asimptote van k</i> ✓y-intercept of h <i>y-afsnit van h</i> ✓shape of h / <i>vorm van h</i> ✓asymptote of h <i>asimptote van h</i>	(5)
				[25]

QUESTION/VRAAG 6				
NO.	SOLUTION/OPLOSSING		EXPLANATION/ VERDUIDELIKING	
6.1	$A = P(1 + i)^n$ $R30\,000 = P(1 + 0.135)^{11}$ $P = R7450,18$		✓ formula / <i>formule</i> ✓ substitution / <i>vervanging</i> ✓ answer / <i>antwoord</i>	(3)
6.2	6.2.1	R200 000	✓ answer / <i>antwoord</i>	(1)
	6.2.2	Simple interest, because the interest is constant. <i>Enkelvoudige rente, omdat die rente konstant is.</i>	✓ Simple interest / <i>Enkelvoudige rente</i> ✓ reason / <i>rede</i>	(2)
	6.2.3	$R200\,000 + 25\,000 + 25\,000 + 25\,000 + 25\,000 + 25\,000 + 25\,000 = R350\,000$ It will cost R350 000 / <i>Dit sal R350 000 kos</i> OR/OF In 2018, it cost/ <i>kos dit</i> R325 00 \therefore In 2019, it will cost/ <i>sal dit kos</i> = $R325\,00 + R25\,000$ = R350 000	✓ method / <i>metode</i> ✓ answer / <i>antwoord</i>	(2)
	6.2.4	$A = P(1 + in)$ $325\,000 = 200\,000(1 + 5i)$ $1,625 = 1 + 5i$ $0,625 = 5i$ $i = 0,125$ Interest rate/ <i>Rentekoers</i> = 12,5%	✓ formula / <i>formule</i> ✓ substituting (any point from the graph) <i>vervanging (enige punt vanaf die grafiek)</i> ✓ $0,625 = 5i$ ✓ answer / <i>antwoord</i>	(4)
6.3	$A = P(1 - in)$ = $385000(1 - 0,06 \times 5)$ = R269500		✓ substituting in a correct formula <i>Vervaning in 'n korrekte formule</i> ✓ answer / <i>antwoord</i>	(2)
				[14]
	TOTAL/TOTAAL:			100