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**JUNE/*JUNIE*
EXAMINATION/*EKSAMEN*
GRADE/*GRAAD* 12**

2026

MARKING GUIDELINES/*NASIENRIGLYNE*

MATHEMATICS/*WISKUNDE*

(*PAPER/VRAESTEL* 1)

22 pages/*bladsye*



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GENERAL NOTES/ALGEMENE NOTAS

1. Consistent accuracy applies in this marking guideline.
2. If a learner answers the same question TWICE, but does not cancel one of the answers, ONLY consider the FIRST attempt.
3. If a learner cancels the answer but does not make a second attempt, consider the cancelled attempt.
4. If a learner provided an answer not mentioned in this memorandum, first check/prove it before disqualifying their attempt. Please check through all OPTIONS provided in this marking guideline.

1. *Konsekwente akkuraatheid geld in hierdie nasienriglyne.*
2. *Indien 'n leerder dieselfde vraag TWEE KEER beantwoord, maar nie een van die antwoorde kanselleer nie, oorweeg SLEGS die EERSTE poging.*
3. *Indien 'n leerder die antwoord kanselleer, maar nie 'n tweede poging aanwend nie, oorweeg die gekanselleerde poging.*
4. *Indien 'n leerder 'n antwoord verskaf het wat nie in hierdie memorandum genoem word nie, moet dit eers nagegaan/bewys word voordat hul poging gediskwalifiseer word. Gaan asseblief al die OPSIES wat in hierdie nasienriglyne verskaf word deur.*

QUESTION/VRAAG 1			
1.1.1	$3x^2 - x = 0$ $x(3x - 1) = 0$ $x = 0$ or/of $3x - 1 = 0$ $x = \frac{1}{3}$	✓ factors/faktore ✓ both x values/beide x -waardes	(2)
1.1.2	$2x^2 + 6x = 6$ $2x^2 + 6x - 6 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(6) \pm \sqrt{(6)^2 - 4(2)(-6)}}{2 \times 2}$ $x = \frac{-6 \pm \sqrt{84}}{4}$ $x = 0,79$ or/of $x = -3,79$ Penalize ONE mark for incorrect rounding	✓ standard form/standaardvorm ✓ correct substitution in the equation <i>korrekte substitusie in vergelyking</i> ✓ $x = 0,79$ ✓ $x = -3,79$	(4)



1.1.3	$-x^2 - 2x \leq -8$ $x^2 + 2x - 8 \geq 0$ $(x + 4)(x - 2) \geq 0$ Critical values/ <i>Kritieke waardes</i> $x + 4 = 0$ or/of $x - 2 = 0$ $x = -4$ and/en $x = 2$ $x \leq -4$ or/of $x \geq 2$	✓ standard form/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓ critical values/ <i>kritiese waardes</i> $x = -4$ and $x = 2$ ✓ $x \leq -4$ or/of $x \geq 2$ Note: If $x < -4$ or $x > 2$ award 3 out 4	(4)
1.1.4	$2^{2x} - 2^x = 12$ Let/Laat $k = 2^x$ $k^2 - k = 12$ $k^2 - k - 12 = 0$ $(k - 4)(k + 3) = 0$ $k = 4$ or $k = -3$ $2^x \neq -3$ No Solution/ <i>Geen oplossing nie</i> $2^x = 4$ $2^x = 2^2$ $x = 2$ OR/OF Alternative method/ <i>Alternatiewe metode</i> $2^{2x} - 2^x - 12 = 0$ $(2^x - 4)(2^x + 3) = 0$ $2^x = 4$ $2^x = -3$ $2^x \neq -3$ No Solution/ <i>Geen oplossing nie</i> $2^x = 2^2$ $x = 2$	✓ K-method/ <i>K-metode</i> ✓ standard form/ <i>standaardvorm</i> ✓ factors/ <i>faktore</i> ✓ $x = 2$ or $2^x \neq -3$ OR/OF ✓ Std form ✓ $(2^x - 4)(2^x + 3) = 0$ ✓ $2^x = 4$ or $2^x \neq -3$ No Solution/ <i>Geen oplossing</i> $2^x = 2^2$ ✓ $x = 2$	(4)



1.1.5	$\sqrt{4x-3} = x$ $(\sqrt{4x-3})^2 = (x)^2$ $4x-3 = x^2$ $x^2-4x+3 = 0$ $(x-3)(x-1) = 0$ $x = 3 \text{ or/of } x = 1$	<ul style="list-style-type: none"> ✓ squaring both sides/<i>kwadreer beide kante</i> ✓ standard form/<i>standaardvorm</i> ✓ factors/<i>faktore</i> ✓ x-values/<i>waardes</i> 	(4)
1.2	$4^{2x+1} = 16^{\frac{y}{2}} \text{ and}$ $x^2 - 2xy = -1 \dots\dots\dots\textcircled{2}$ $4^{2x+1} = 4^2\left(\frac{y}{2}\right)$ $2x + 1 = 2\left(\frac{y}{2}\right)$ $y = 2x + 1 \dots\dots\dots\textcircled{3}$ <p>Substitution equation 3 into 2/<i>Substitusie gelykstelling 3 in 2</i></p> $x^2 - 2xy = -1$ $x^2 - 2x(2x + 1) + 1 = 0$ $x^2 - 4x^2 - 2x + 1 = 0$ $-3x^2 - 2x + 1 = 0$ $3x^2 + 2x - 1 = 0$ $(x + 1)(3x - 1) = 0$ $x = -1 \text{ or/of } x = \frac{1}{3}$ <p>When/<i>Wanneer</i> $x = -1$ When/<i>Wanneer</i></p> $x = \frac{1}{3}$ $y = 2x + 1 \qquad y = 2\left(\frac{1}{3}\right) + 1$ $y = 2(-1) + 1 \qquad y = \frac{2}{3} + 1$ $y = -2 + 1$ $y = -1$	<ul style="list-style-type: none"> ✓ $4^{2x+1} = 4^2\left(\frac{y}{2}\right)$ ✓ $y = 2x + 1$ ✓ substitution/<i>substitusie</i> ✓ factors/<i>faktore</i> ✓ x-values/<i>waardes</i> ✓ y-values/<i>waardes</i> <p>Note CA only if solving a quadratic function.</p>	(6)

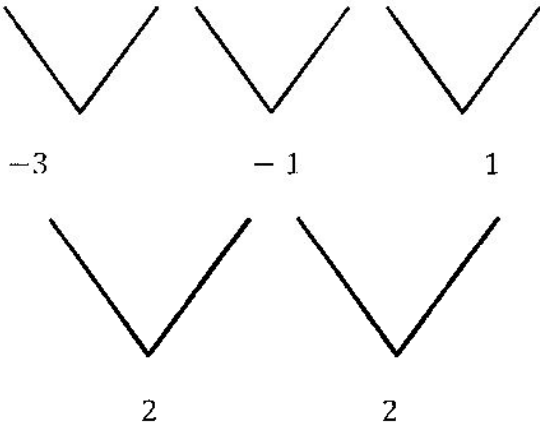



1.3	$\sqrt[4]{\frac{4^{1013} - 2^{2025}}{2^{2017}}}$ $\left(\frac{2^{2(1013)} - 2^{2025}}{2^{2017}}\right)^{\frac{1}{4}}$ $\left(\frac{2^{2026} - 2^{2025}}{2^{2017}}\right)^{\frac{1}{4}}$ $\left[\frac{2^{2025}(2^1 - 1)}{2^{2017}}\right]^{\frac{1}{4}}$ $(2^8)^{\frac{1}{4}}$ 4	<p>✓ 2^{2026}</p> <p>✓ common factor/<i>vereenvouding</i></p> <p>✓ Simplify</p> <p>✓ answer/<i>antwoord</i></p>	(4)
1.4	$x^2 - px + 1 = 0$ $\Delta \geq 0$ $(-p)^2 - 4(1)(1) \geq 0$ $p^2 - 4 \geq 0$ <p>Critical values/<i>Kritieke waardes</i>:</p> $p = \pm\sqrt{4}$ $p = -2 \text{ and/en } p = 2$ $p \leq -2 \quad \text{or/of} \quad p \geq 2$	<p>✓ Standard form/<i>standaardvorm</i></p> <p>✓ $p^2 - 4$</p> <p>✓ $\Delta \geq 0$</p> <p>✓ critical values/<i>kritieke waardes</i></p> <p>✓ $p \leq -2$</p> <p>✓ $p \geq 2$</p>	(6)

[34]



QUESTION/VRAAG 2

2.1	-15 ; -12	✓ -15 ✓ -12	(2)
2.2	<p style="text-align: center;"> -12 -15 -16 -15  -3 -1 1  2 2 </p> <p> $2a = 2$ $3(1) + b = -3$ $\therefore a = 1$ $\therefore b = -3 - 3 = -6$ $1 + (-6) + c = -12$ $\therefore c = -12 + 5 = -7$ $T_n = n^2 - 6n - 7$ </p>	✓ $a = 1$ ✓ $b = -6$ ✓ $c = -7$ ✓ $n^2 - 6n - 7$	(4)



<p>2.3</p> <p>$n^2 - 6n - 7 > 0$ $(n - 7)(n + 1) > 0$</p> <p>Critical values/<i>Kritieke waardes</i>: $n = 7$ and/en $n \neq -1$</p> <div style="border: 2px solid black; padding: 5px; margin: 10px 0;"> <p>AWARD A MARK FOR CRITICAL VALUES EVEN IF A CANDIDATE WRITES $n = -1$ KEN 'N PUNT TOE VIR KRITIEKE WAARDES SELFS AL SKRYF 'N KANDIDAAT $n = -1$ Do not penalize if $n \in \mathbb{N}$ is omitted.</p> </div> <p>$n \in \mathbb{N}, n > 7$ (accept $n \geq 8$)</p> <p>OR/OF</p> <p>$n^2 - 6n - 7 > 0$</p> $n = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-7)}}{2(1)}$ $n = \frac{6 \pm \sqrt{64}}{2}$ <p>Critical values/<i>Kritieke waardes</i>:</p> <p>$n = 7$ or/of $n \neq -1$</p> <p>$n \in \mathbb{N}, n > 7$ (Accept $n \geq 8$)</p> <p>OR/OF</p> <p>$n^2 - 6n - 7 > 0$ $(n - 3)^2 = 7 + 9$ $(n - 3)^2 = 16$</p> <p>$n = 3 \pm 4$</p> <p>Critical values/<i>Kritieke waaardes</i>:</p> <p>$n = 7$ or/of $n \neq -1$</p> <p>$n \in \mathbb{N}, n > 7$ (accept $n \geq 8$)</p> <p>OR Accept when expanded (and Shown) the terms and made a conclusion</p> <p>(FULL marks)</p>		<p>✓ inequality/ ongelykheid</p> <p>✓ factorization/ faktorisering</p> <p>✓ critical values./ kritieke waardes</p> <p>✓ $n \in \mathbb{N}, n > 7$</p> <p>OR/OF</p> <p>✓ inequality/ ongelykheid</p> <p>✓ quadratic formula/ kwadratiese formule</p> <p>✓ critical values/ kritieke waardes</p> <p>✓ $n \in \mathbb{N}, n > 7$</p> <p>OR/OF</p> <p>✓ Inequality/ Ongelykheid</p> <p>✓ Completion of a Square./ Vierkantvoltooiing</p> <p>✓ Critical values/ Kritieke waardes</p> <p>✓ $n \in \mathbb{N}, n > 7$</p>	(4)
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2.4	<p> $T_n = a + (n - 1)d$ $T_n = -3 + (n - 1)(2)$ $T_n = 2n - 5$ $2n - 5 = 113$ $2n = 118$ $n = 59$ $\therefore T_{59}$ and T_{60} are the two consecutive terms with a first difference of 113./is die twee opeenvolgende terme met 'n eerste verskil van 113. </p> <p>OR/OF</p> <p> $T_n = n^2 - 6n - 7$ $T_{n-1} = (n - 1)^2 - 6(n - 1) - 7$ $T_{n-1} = n^2 - 2n + 1 - 6n + 6 - 7 = n^2 - 8n$ $T_n - T_{n-1} = n^2 - 6n - 7 - (n^2 - 8n)$ $2n - 7 = 113$ $n = 60$ $\therefore n - 1 = 60 - 1 = 59$ T_{59} and T_{60} are the two consecutive terms with a first difference of 113./is die twee opeenvolgende terme met 'n eerste verskil van 113. </p> <p>OR/OF</p> <p> $T_n = n^2 - 6n - 7$ $T_{n+1} = (n + 1)^2 - 6(n + 1) - 7$ $T_{n+1} = n^2 + 2n + 1 - 6n - 6 - 7 = n^2 - 4n - 12$ $T_{n+1} - T_n = n^2 - 4n - 12 - (n^2 - 6n - 7)$ $2n - 5 = 113$ $n = 59$ $\therefore n + 1 = 59 + 1 = 60$ T_{59} and T_{60} are the two consecutive terms with a first difference of 113./is die twee opeenvolgende terme met 'n eerste verskil van 113. </p>	<p> $\checkmark T_n = 2n - 5$ \checkmark equating to 113/ <i>stel gelyk aan 113</i> $\checkmark 59$ $\checkmark 60$ </p> <p>OR/OF</p> <p> $\checkmark T_n = 2n - 7$ \checkmark equating to 113 <i>stel gelyk aan 113</i> $\checkmark 60$ $\checkmark 59$ </p> <p>OR/OF</p> <p> $\checkmark T_n = 2n - 5$ \checkmark equating to 113/ <i>stel gelyk aan 113</i> $\checkmark 59$ $\checkmark 60$ </p>	(4)
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QUESTION/VRAAG 3

3.1	$T_n = a + (n - 1)d$ $T_n = 5 + (n - 1)(4)$ $T_n = 4n + 1$ $4n + 1 = 1001$ $4n = 1000$ $n = 250$	$\checkmark T_n = 4n + 1$ $\checkmark \text{equating to } 1001$ $\text{stel gelyk aan } 1001$ $\checkmark 250$	(3)
3.2	$S_n = a + (a + d) + (a + 2d) + (a + 3d) + \dots + l$ $+ [S_n = l + (l - d) + (l - 2d) + (l - 3d) + \dots + a]$ <hr/> $2S_n = (a + l) + (a + l) + (a + l) + \dots + (a + l)$ <p style="text-align: right;"><i>n times/keer</i></p> $2S_n = n(a + l)$ $S_n = \frac{n}{2}(a + l)$ <p>But $l = a + (n - 1)d$</p> $\therefore S_n = \frac{n}{2}[a + a + (n - 1)d]$ $\therefore S_n = \frac{n}{2}[2a + (n - 1)d]$	$\checkmark S_n = a + (a + d) + \dots + l$ $\checkmark + [S_n = l + (l - d) + \dots + a]$ $\checkmark S_n = \frac{n}{2}(a + l)$ $\checkmark \text{substitution of } l \text{ using/}$ $\text{substitusie van } l \text{ deur}$ gebruik van $l = a + (n - 1)d$	(4)
3.3	$\sum_{p=-1}^{19} (3p - 2) = (-5) + (-2) + 1 + \dots + 55$ $n = 19 - (-1) + 1 = 21$ $S_{21} = \frac{21}{2}(-5 + 55)$ $S_{21} = \frac{21}{2}(50)$ $= 525$	$\checkmark \text{expansion/uitbreiding}$ $\checkmark n = 21$ $\checkmark \text{substitution into}$ correct formula/ $\text{substitusie in korrekte}$ formule $\checkmark 55$ $\checkmark 525$	

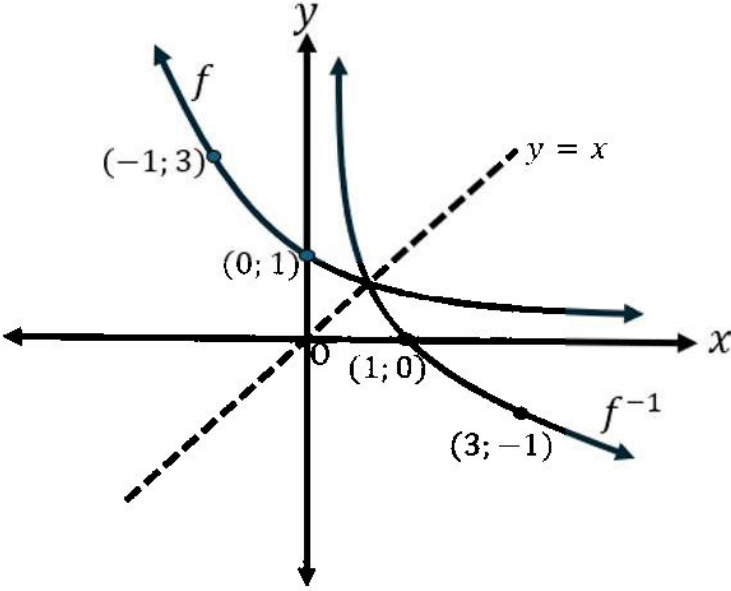


	<p>OR/OF</p> $\sum_{p=-1}^{19} (3p - 2) = (-5) + (-2) + 1 + \dots + 55$ $n = 19 - (-1) + 1 = 21$ $d = 3$ $S_n = \frac{n}{2} [2a + (n - 1)d]$ $S_{21} = \frac{21}{2} [2(-5) + (21 - 1)3]$ $S_{21} = \frac{21}{2} [-10 + 60]$ $= 525$	<p>OR/OF</p> <p>✓ expand</p> <p>✓ $n = 21$</p> <p>✓ $d = 3$</p> <p>✓ substitution into correct formula</p> <p><i>substitusie in korrekte formule</i></p> <p>✓ 525</p>	(5)
3.4.1	128x	✓ 128x	(1)
3.4.2	$T_n = ar^{n-1}$ $T_8 = ar^7$ $x = (128x)r^7$ $r^7 = \frac{1}{128}$ $r = \left(\frac{1}{128}\right)^{\frac{1}{7}} = \frac{1}{2}$	<p>✓ substitution into correct formula</p> <p><i>substitusie in formule</i></p> <p>✓ simplification</p> <p><i>vereenvoudiging</i></p> <p>✓ $r = \frac{1}{2}$</p>	(3)
3.4.3	$S_n = \frac{a[1 - r^n]}{1 - r}$ $15,9375 = \frac{128x[1 - (\frac{1}{2})^8]}{1 - \frac{1}{2}}$ $x = \frac{\frac{1}{2} [15.9375]}{128[1 - (\frac{1}{2})^8]} = 0,0625 \text{ metres}$ <p>The longest piece is/Die langste stuk is</p> $= 128 \times 0,0625 \text{ m} = 8 \text{ metres/meter}$	<p>✓ substitution into correct formula</p> <p><i>substitusie in korrekte formule</i></p> <p>✓ simplification/</p> <p><i>vereenvoudiging</i></p> <p>✓ 0,0625</p> <p>✓ 8</p>	(4)

[20]



QUESTION/VRAAG 4

4.1	$y = \left(\frac{1}{3}\right)^x$ <p>For inverse/<i>Vir inversie:</i></p> $x = \left(\frac{1}{3}\right)^y$ $y = \log_{\frac{1}{3}} x$ <p>or/of</p> $y = -\log_3 x$ <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> ANSWER ONLY- FULL MARKS/ SLEGS ANTWOORD – VOLPUNTE </div>	<ul style="list-style-type: none"> ✓ interchanging/ <i>vervangings van</i> <i>x and/en y.</i> <i>ruil x en y</i> ✓ answer/ <i>antwoord</i> 	(2)
4.2		<p>FOR f</p> <ul style="list-style-type: none"> ✓ y-intercept <i>y-afsnit</i> ✓ any other point/ <i>enige and punt</i> ✓ Shape/<i>Vorm</i> <p>FOR f^{-1}</p> <ul style="list-style-type: none"> ✓ x-intercept/ <i>x-afsnit</i> ✓ any other point/ <i>enige ander punt</i> ✓ shape/<i>vorm</i> 	(6)



4.3	$f^{-1}(x) > -3$ Critical values/ <i>Kritieke waardes</i> : $\log_{\frac{1}{3}} x = -3$ or/of $-\log_3 x = -3$ $x = 27$ $0 < x < 27$ OR/OF $\log_{\frac{1}{3}} x > -3$ $x < \left(\frac{1}{3}\right)^{-3}$ $x < 27$; but/ <i>maar</i> $x > 0$ $\therefore 0 < x < 27$ <div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> ANSWER ONLY – FULL MARKS/ SLEGS ANTWOORD – VOLPUNTE </div>	$\checkmark x = 27$ $\checkmark 0 < x < 27$	(2)
[10]			



QUESTION/VRAAG 5

5.1	$m_1 \times m_2 = \frac{1}{2} \times (-2) = -1$	$\checkmark \frac{1}{2} \times (-2)$ $\checkmark -1$	(2)
5.2	<p>At/By R: $h(x) = g(x)$</p> $\frac{1}{2}x - 4 = -2x - 14$ $\frac{1}{2}x = -2x - 10$ $x = -4x - 20$ $5x = -20$ $\therefore x = -4$ $h(-4) = -2x - 14$ $\therefore y = -2(-4) - 14 = -6$ $R(-4; -6)$	\checkmark equating the two functions/ <i>stel twee funksie gelyk</i> $\checkmark x = -4$ $\checkmark R(-4; -6)$	(3)
<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>DO NOT PENALISE IF NOT IN COORDINATES FORM/ MOENIE PENALISEER INDIEN NIE IN KOÖRDINATE FORMAAT NIE.</p> </div>			
5.3	<p>At Q and/en T; $y = 0$</p> $-x^2 - 6x + 7 = 0$ $x^2 + 6x - 7 = 0$ $(x + 7)(x - 1) = 0$ $x = -7 \text{ or/of } x = 1$ $\therefore QT = 1 - (-7) = 8 \text{ units/eenhede}$	\checkmark factorisation/method <i>faktorisering/metode</i> \checkmark x-values/waardes $\checkmark 8$	(3)





5.4.1	$Q(-7; 0)$ $y = \frac{1}{2}x + c$ $0 = \frac{1}{2}(-7) + c$ $c = \frac{7}{2}$ $(0; \frac{7}{2})$ $W(x) = \frac{1}{2}x + \frac{7}{2}$	\checkmark substitution/substitusie $\checkmark \frac{7}{2}$	(2)
5.4.2	$f(x) = -x^2 - 6x + 7$ $f'(x) = -2x - 6$ At the turning point/By die draaipunt, $f'(x) = 0$ $-2x - 6 = 0$ $\therefore x = -3$ $f(-3) = -(-3)^2 - 6(-3) + 7 = 16$ $W(-3) = \frac{1}{2}(-3) + \frac{7}{2} = 2$ $\therefore PM = 16 - 2 = 14$ units/eenhede OR/OF $x = \frac{1 + (-7)}{2} = -3$ $f(-3) = -(-3)^2 - 6(-3) + 7 = 16$ $W(-3) = \frac{1}{2}(-3) + \frac{7}{2} = 2$ $\therefore PM = 16 - 2 = 14$ units/eenhede	$\checkmark x = -3$ $\checkmark 16$ $\checkmark 2$ $\checkmark 14$	



<p>OR/OF</p> $f(x) = -(x + 3)^2 + 16$ <p>P(-3; 16)</p> $W(-3) = \frac{1}{2}(-3) + \frac{7}{2} = 2$ <p>M(-3; 2)</p> <p>PM = 16 - 2 = 14 units/eenhede</p> <p>OR/OF</p> $x = \frac{1 + (-7)}{2} = -3$ $PM = -x^2 - 6x + 7 - \left(\frac{1}{2}x + \frac{7}{2}\right)$ $= -x^2 - \frac{13x}{2} + \frac{7}{2}$ $\therefore PM = -(-3)^2 - \frac{13(-3)}{2} + \frac{7}{2} =$ <p>14 units/eenhede</p>	<p>OR/OF</p> <p>✓ $x = -3$</p> <p>✓ $f - w$</p> <p>✓ substitution/substitusie</p> <p>✓ 14</p>	<p>(4)</p>
		[14]





QUESTION/VRAAG 6

6.1	E (0 ; -15)	✓ (0 ; -15)	(1)
6.2	$x^2 - 2x - 15 = 0$ $(x + 3)(x - 5) = 0$ $x = -3$ or $x = 5$ B (5 ; 0)	✓ equate to zero ✓ factorisation/method <i>faktorisering/metode</i> ✓ $x = 5$ \	(3)
6.3	$f(1) = (1)^2 - 2(1) - 15 = -16$ $y \geq -16$	✓ substitute ✓ $y \geq -16$	(2)



6.4.1	$p = -1$ $q = -2$	✓ -1 ✓ -2	(2)
6.4.2	$g(x) = \frac{a}{x-1} - 2$ Use/Gebruik B (5 ; 0) $0 = \frac{a}{5-1} - 2$ $2 = \frac{a}{4}$ $\therefore a = 8$	✓ substitution for p and q/ <i>vervang p en q</i> ✓ substitution / <i>substitusie</i> ✓ simplification/ <i>vereenvoudiging</i>	(3)
6.4.3	$y = -(x-1) - 2$ $y = -x - 1$ OR/OF $y = -x + c$ Use/Gebruik H (1 ; -2) $-2 = -1 + c \Rightarrow c = -1$ $\therefore y = -x - 1$	✓ <i>gradient = -1</i> ✓ <i>y intercept</i>	(2)
6.5	$-2,41 < x < 0,41$ OR/OF $1 < x < 5$	✓ $-2,41$ and/en $0,41$ ✓ 1 and/en 5 ✓ correct inequality symbols for <i>both./korrekte ongelykheid</i> <i>notasie</i>	(3)



6.6	$\frac{8}{x-1} - 2 = -2x + k$ $8 - 2(x-1) = -2x(x-1) + k(x-1)$ $8 - 2x + 2 = -2x^2 + 2x + kx - k$ $2x^2 - (4+k)x + 10 + k = 0$ $b^2 - 4ac < 0$ $[-(4+k)]^2 - 4(2)(10+k) < 0$ $k^2 + 8k + 16 - 80 - 8k < 0$ $k^2 - 64 < 0$ $(k+8)(k-8) < 0$ <p>Critical values / Kritisiese waardes</p> $k = -8 \text{ or } k = 8$ $-8 < k < 8$	<ul style="list-style-type: none"> ✓ equating / gelykstelling ✓ simplification / vereenvoudiging to $k^2 - 64$ ✓ factorisation / faktoriserings ✓ critical values / kritiese waardes ✓ $-8 < k < 8$ 	(5)
			[21]

QUESTION / VRAAG 7 | ONLY Penalize for notation in 7.1]

7.1	<p>Given / Gegee: $f(x) = 4x^2 - 3x$</p> $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $f'(x)$ $= \lim_{h \rightarrow 0} \frac{4(x+h)^2 - 3(x+h) - (4x^2 - 3x)}{h}$ $= \lim_{h \rightarrow 0} \frac{4x^2 + 8xh + 4h^2 - 3x - 3h - 4x^2 + 3x}{h}$ $= \lim_{h \rightarrow 0} \frac{8xh + 4h^2 - 3h}{h}$ $= \lim_{h \rightarrow 0} \frac{h(8x + 4h - 3)}{h}$ $= \lim_{h \rightarrow 0} (8x + 4h - 3)$ $\therefore f'(x) = 8x - 3$	<ul style="list-style-type: none"> ✓ $f(x+h)$ $= 4x^2 + 8xh + 4h^2 - 3x - 3h$ ✓ substitution into correct formula / substitusie in korrekte formule ✓ $8xh + 4h^2 - 3h$ ✓ $8x + 4h - 3$ ✓ $f'(x) = 8x - 3$ 	(5)
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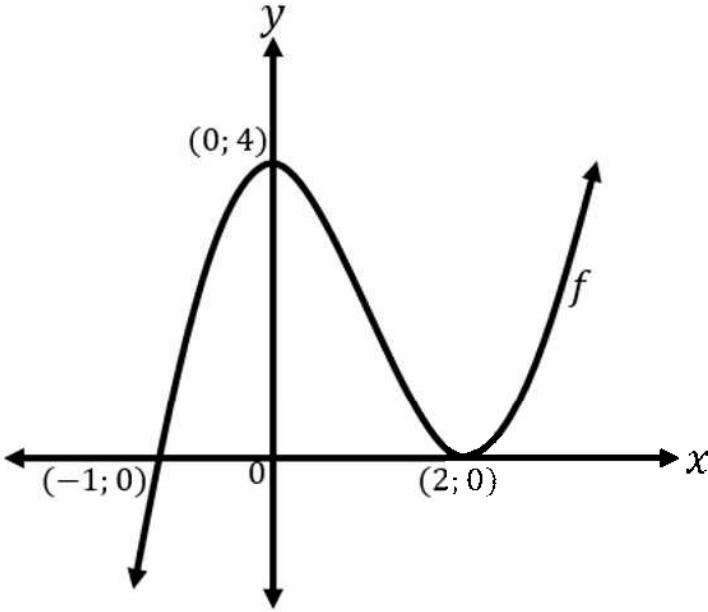
7.2	$D_x \left[\frac{x^2 - 9}{3 - x} \right]$ $D_x \left[\frac{(x - 3)(x + 3)}{-(x - 3)} \right]$ $D_x [-(x + 3)]$ $D_x [-x - 3]$ -1	$\checkmark \frac{(x - 3)(x + 3)}{-(x - 3)}$ $\checkmark -(x + 3)$ $\checkmark -1 \text{ answer/antwoord}$	(3)
7.3	$y = (2x - 3)^2$ $y = (2x - 3)^2$ $y = 4x^2 - 12x + 9$ $\frac{dy}{dx} = 8x - 12$ $= 4(2x - 3)$ <p>But/Maar $2x - 3 = \sqrt{y}$</p> $\therefore \frac{dy}{dx} = 4(\sqrt{y})$	$\checkmark \text{expand/brei uit}$ $y = 4x^2 - 12x + 9$ $\checkmark \frac{dy}{dx} = 8x - 12$ $\checkmark \text{factorisation/faktorisering}$ $4(2x - 3)$ $\checkmark \sqrt{y} = 2x - 3$	(4)
			[12]



QUESTION 8

8.1	$f(x) = x^3 - 3x^2 + 4$ x -intercept/afsnit, $y = 0$ $x^3 - 3x^2 + 4 = 0$ $x = -1$ $(x - 2)(x - 2)(x + 1) = 0$ $\therefore x = 2$ or $x = -1$ $(2; 0)$ and/en $(-1; 0)$ y -intercept/afsnit, $x = 0$ $f(0) = (0)^3 - 3(0)^2 + 4$ $y = 4$ $(0; 4)$	\checkmark equating to 0/ <i>stel gelyk aan 0</i> \checkmark factorisation/faktoriseer $\checkmark x = 2$ $\checkmark x = -1$ $\checkmark y = 4$	(5)
NO PENALTY IF INTERCEPTS ARE NOT IN COORDINATES FORM/ GEEN PENALISERING INDIEN AFSNITTE NIE IN KOÖRDINAATVORM IS NIE			
8.2	$f(x) = x^3 - 3x^2 + 4$ $f'(x) = 0$ $f'(x) = 3x^2 - 6x$ $3x^2 - 6x = 0$ $3x(x - 2) = 0$ $x = 0$ or $x = 2$ When/Wanneer $x = 0$ $f(0) = (0)^3 - 3(0)^2 + 4$ $y = 4$ $(0; 4)$ When/Wanneer $x = 2$ $f(2) = (2)^3 - 3(2)^2 + 4$ $y = 0$ $(2; 0)$	$\checkmark f'(x) = 3x^2 - 6x$ $\checkmark f'(x) = 0$ $\checkmark x$ values $\checkmark y$ values	(4)



8.3		<ul style="list-style-type: none"> ✓ <i>x</i>-intercepts/<i>afsnitte</i> ✓ <i>y</i>-intercepts/<i>afsnitte</i> ✓ turning points/<i>draaipunt</i> ✓ shape/<i>vorm</i> 	(4)
8.4	$f(x) = x^3 - 3x^2 + 4$ $f'(x) = 3x^2 - 6x$ $f'(x) = 0$ $f''(x) = 6x - 6$ $f''(x) = 0$ $6x - 6 = 0$ $6x = 6$ $x = 1$ $\therefore x > 1$ <p>OR/OF</p> $x = \frac{0+2}{2}$ $x = 1$ $\therefore x > 1$	<ul style="list-style-type: none"> ✓ $f''(x) = 6x - 6$ ✓ $x > 1$ <p>OR/OF</p> <ul style="list-style-type: none"> ✓ $\frac{0+2}{2}$ ✓ $x > 1$ 	(2)
8.5	$p < -4 \text{ or } p > 0$ <p>NB due to the incorrect naming of the new function allow for answer : $p = 0$ (award FULL MARKS)</p>	<ul style="list-style-type: none"> ✓ $p < -4$ ✓ $p > 0$ 	(2)

QUESTION/VRAAG 9

9.1	$P(x) = -2x^2 + 160x + 19\,600$ $P(5) = -2(5)^2 + 160(5) + 19\,600$ $= R20\,350$	$\checkmark -2(5)^2 + 160(5) + 19\,600$ $\checkmark R20\,350$	(2)
9.2	$P(x) = -2x^2 + 160x + 19\,600$ $p'(x) = -4x + 160$ $p'(x) = 0$ $-4x + 160 = 0$ $4x = 160$ $x = 40$ $\therefore 40$ teachers/onderwysers	$\checkmark p'(x) = -4x + 160$ $\checkmark -4x + 160 = 0$ \checkmark simplify $\checkmark 40$ teachers/onderwysers	(4)
9.3	$P(x) = -2x^2 + 160x + 19\,600$ $P(40) = -2(40)^2 + 160(40) + 19\,600$ Maximum profit/Maksimum profit = R22 800	$\checkmark P(40) = -2(40)^2 + 160(40) + 19\,600$ $\checkmark R22\,800$	(2)
			[8]

TOTAL/TOTAAL: 150

SA EXAM PAPERS

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