



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE EXAMINATIONS/
SENIORSERTIFIKAAT-EKSAMEN
NATIONAL SENIOR CERTIFICATE EXAMINATIONS/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN**

MATHEMATICS P1/WISKUNDE V1

MARKING GUIDELINES/NASIENRIGLYNE

MAY/JUNE/MEI/JUNIE 2024

**MARKS: 150
PUNTE: 150**

APPROVED
DR CAREL KREK...
11/05/2024

APPROVED
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11/05/2024

These marking guidelines consist of 16 pages./
Hierdie nasienriglyne bestaan uit 16 bladsye.

DEPARTMENT OF BASIC
EDUCATION
PRIVATE BAG X895, PRETORIA 0001
2024 -05- 18
APPROVED MARKING GUIDELINE
PUBLIC EXAMINATIONS

APPROVED
11/05/2024

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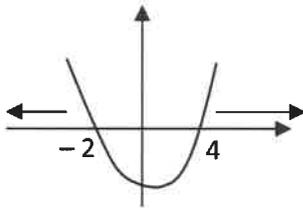
NOTE:

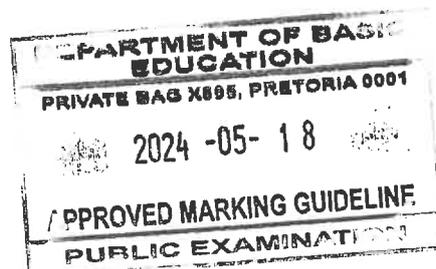
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in all aspects of the marking memorandum.

LET WEL:

- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.
- Volgehoue akkuraatheid is DEURGAANS op ALLE aspekte van die nasienriglyne van toepassing.

QUESTION 1/VRAAG 1

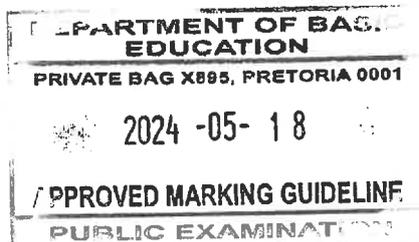
<p>1.1.1</p>	$3x^2 + 5x = 0$ $x(3x + 5) = 0$ $x = 0 \text{ or } x = -\frac{5}{3}$	<p>✓ factors ✓ both answers</p> <p>(2)</p>
<p>1.1.2</p>	$4x^2 + 3x - 5 = 0$ $x = \frac{- (3) \pm \sqrt{(3)^2 - 4(4)(-5)}}{2(4)}$ $x = 0,80 \text{ or } x = -1,55$	<p>✓ correct substitution into correct formula ✓ answer ✓ answer</p> <p>(3)</p>
<p>1.1.3</p>	$(x - 1)^2 - 9 \geq 0$ $x^2 - 2x - 8 \geq 0$ $(x - 4)(x + 2) \geq 0$ $x = 4 \text{ or } x = -2$ $x \leq -2 \text{ or } x \geq 4$	 <p>✓ simplification ✓ critical values ✓✓ $x \leq -2$ or $x \geq 4$</p> <p>(4)</p>
<p>1.1.4</p>	$5^{2x} - 5^x = 0$ $5^x(5^x - 1) = 0$ $5^x \neq 0 \text{ or } 5^x = 1$ $x = 0$ <p>OR/OF</p> $5^{2x} = 5^x$ $2x = x$ $x = 0$	<p>✓✓ common factor ✓ $5^x \neq 0$ ✓ $x = 0$</p> <p>(4)</p> <p>OR/OF</p> <p>✓✓ $5^{2x} = 5^x$ ✓ $2x = x$ ✓ $x = 0$</p> <p>(4)</p>



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<p>1.1.5</p>	$\frac{x}{\sqrt{20-x}} = 1$ $x = \sqrt{20-x}$ $x^2 = 20-x$ $x^2 + x - 20 = 0$ $(x+5)(x-4) = 0$ $x = 4 \text{ or } x = -5$	<ul style="list-style-type: none"> ✓ isolating the surd ✓ squaring both sides ✓ standard form ✓ both answers ✓ selection <p style="text-align: right;">(5)</p>
<p>1.2</p>	$2x^2 - y^2 = 7 \quad \dots (1)$ $x + y = 9 \quad \dots (2)$ $y = 9 - x$ $2x^2 - (9-x)^2 = 7$ $2x^2 - 81 + 18x - x^2 = 7$ $x^2 + 18x - 88 = 0$ $(x+22)(x-4) = 0$ $x = -22 \text{ or } x = 4$ $y = 31 \text{ or } y = 5$ <p>OR/OF</p> $2x^2 - y^2 = 7 \quad \dots (1)$ $x + y = 9 \quad \dots (2)$ $x = 9 - y$ $2(9-y)^2 - y^2 = 7$ $2(81 - 18y + y^2) - y^2 - 7 = 0$ $162 - 36y + 2y^2 - y^2 - 7 = 0$ $y^2 - 36y + 155 = 0$ $(y-31)(y-5) = 0$ $y = 31 \text{ or } y = 5$ $x = -22 \text{ or } x = 4$	<ul style="list-style-type: none"> ✓ $y = 9 - x$ ✓ substitution ✓ standard form ✓ x-values ✓ y-values <p style="text-align: right;">(5)</p> <p>OR/OF</p> <ul style="list-style-type: none"> ✓ $x = 9 - y$ ✓ substitution ✓ standard form ✓ y-values ✓ x-values <p style="text-align: right;">(5)</p>
<p>1.3</p>	$P \times T = (1-a)(1+a)(1+a^2)(1+a^4) \dots (1+a^{512})$ $P \times T = (1-a^2)(1+a^2)(1+a^4) \dots (1+a^{512})$ $P \times T = (1-a^4)(1+a^4) \dots (1+a^{512})$ $P \times T = (1-a^8) \dots (1+a^{512})$ $P \times T = (1-a^{512})(1+a^{512})$ $= 1 - a^{1024}$	<ul style="list-style-type: none"> ✓ $(1-a^4)$ ✓ $(1-a^{512})$ ✓ $1 - a^{1024}$ <p style="text-align: right;">(3)</p>

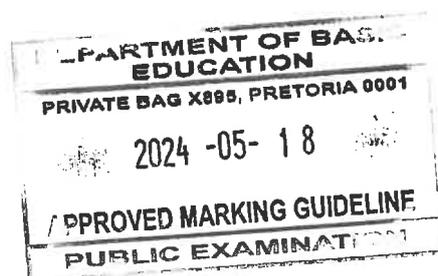
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QUESTION 2/VRAAG 2

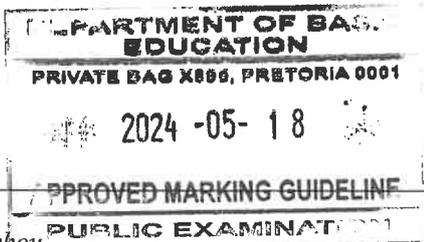
2.1.1	$r = \frac{1}{2}$ <p>Yes, because $-1 < \frac{1}{2} < 1$</p>	<p>✓ yes</p> <p>✓ reason</p> <p style="text-align: right;">(2)</p>
2.1.2	$S_{\infty} = \frac{a}{1-r}$ $S_{\infty} = \frac{4}{1-\frac{1}{2}}$ $\therefore S_{\infty} = 8$	<p>✓ substitution of a and r into the correct formula</p> <p>✓ answer</p> <p style="text-align: right;">(2)</p>
2.2	$\sum_{p=k}^{10} 3^{p-1} = 3^{k-1} + 3^{k+1-1} + 3^{k+2-1} + \dots + 3^9$ $= 3^{k-1} + 3^k + 3^{k+1} + \dots + 3^9$ $S_n = \frac{a(r^n - 1)}{r - 1}$ $29\,520 = \frac{3^{k-1}(3^{11-k} - 1)}{3 - 1}$ $3^{10} - 3^{k-1} = 59\,040$ $3^{k-1} = 9$ $k - 1 = 2$ $\therefore k = 3$	<p>✓ $3^{k-1} + 3^k$</p> <p>✓ $r = 3$</p> <p>✓ substitution of 3^{k-1} in correct sum formula</p> <p>✓ $n = 11 - k$</p> <p>✓ answer</p> <p style="text-align: right;">(5)</p>
		[9]





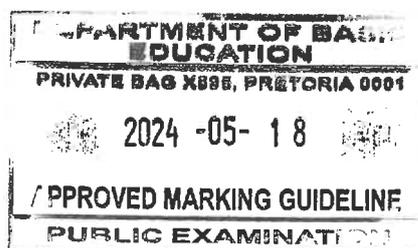

QUESTION 3/VRAAG 3

<p>3.1.1</p>	$ \begin{array}{c} 3; 7; 12; 18 \\ \vee \vee \vee \\ \text{First diff: } 4; 5; 6 \\ \vee \vee \\ \text{Second diff: } 1; 1 \\ 2a=1 \\ a = \frac{1}{2} \\ 3a + b = 4 \\ 3\left(\frac{1}{2}\right) + b = 4 \\ b = \frac{5}{2} \\ a + b + c = 3 \\ \frac{1}{2} + \frac{5}{2} + c = 3 \\ c = 0 \\ T_n = \frac{1}{2}n^2 + \frac{5}{2}n \end{array} $	$ \begin{array}{l} \checkmark 2a=1 \\ \checkmark 3\left(\frac{1}{2}\right) + b = 4 \\ \checkmark \frac{1}{2} + \frac{5}{2} + c = 3 \end{array} $ <p style="text-align: right;">(3)</p>
<p>3.1.2</p>	$ \begin{array}{l} 13\ 527 = \frac{1}{2}n^2 + \frac{5}{2}n \\ n^2 + 5n - 27\ 054 = 0 \\ (n-162)(n+167) = 0 \\ n = 162 \text{ or } n = -167 \\ T_{161} = 13\ 363 \\ 13\ 527 - 13\ 363 = 164 \\ 164 \text{ must be added.} \\ \text{OR/OF} \\ T_n = 3 + \text{sum of 1}^{\text{st}} \text{ differences} \\ 13\ 527 = 3 + 4 + 5 + \dots + n \\ S_n = \frac{n}{2}[2(4) + (n-1)(1)] \\ = \frac{n}{2}(7+n) \\ 3 + \frac{n}{2}(7+n) = 13\ 527 \\ 6 + 7n + n^2 = 27\ 054 \\ n^2 + 7n - 27\ 048 = 0 \\ (n-161)(n+168) = 0 \\ n = 161 \\ \therefore T_n = 3 + n \\ T_{161} = 3 + 161 \\ = 164 \end{array} $	$ \checkmark 13\ 527 = \frac{1}{2}n^2 + \frac{5}{2}n $ <p> \checkmark answers for n $\checkmark 13\ 527 - 13\ 363$ $\checkmark 164$ </p> <p style="text-align: right;">(4)</p> <p>OR/OF</p> <p> $\checkmark 13\ 527 = 3 + 4 + 5 + \dots + n$ $\checkmark 3 + \frac{n}{2}(7+n) = 13\ 527$ </p> <p> \checkmark answers for n $\checkmark 164$ </p> <p style="text-align: right;">(4)</p>

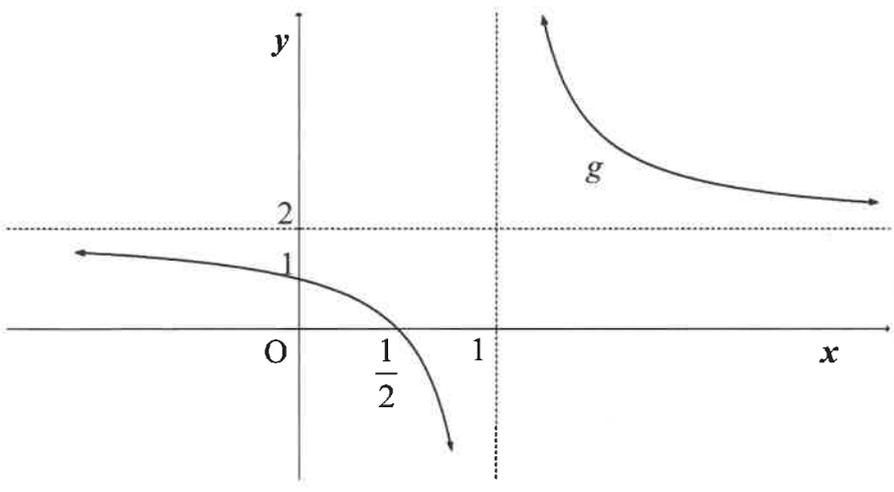


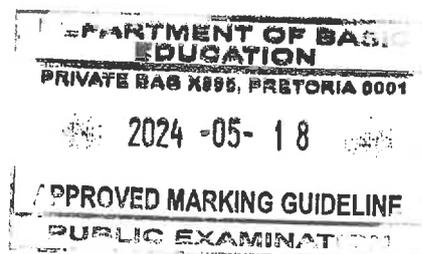
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3.2.1	$T_n = 8 + (n-1)(3)$ $T_n = 3n + 5$ $41 = 3n + 5$ $36 = 3n$ $n = 12$	$\checkmark T_n = 3n + 5$ $\checkmark T_n = 41$ \checkmark answer (3)
3.2.2a	$P_{41} = 12$	\checkmark answer (1)
3.2.2b	$P_8 = a + 7d = 1$ $P_{11} = a + 10d = 2$ $3d = 1$ $d = \frac{1}{3}$ $a + 7\left(\frac{1}{3}\right) = 1$ $a = -\frac{4}{3}$ OR/OF $n = 3P_n + 5$ $1 = 3P_1 + 5$ $-4 = 3P_1$ $P_1 = -\frac{4}{3}$ OR/OF $T_n = 3n + 5$ $1 = 3n + 5$ $n = -\frac{4}{3}$ $\therefore P_1 = -\frac{4}{3}$	$\checkmark a + 7d = 1$ $\checkmark a + 10d = 2$ \checkmark value of d \checkmark value of a (4) OR/OF $\checkmark n = 3P_n + 5$ $\checkmark \checkmark 1 = 3P_1 + 5$ $\checkmark P_1 = -\frac{4}{3}$ (4) OR/OF $\checkmark \checkmark 1 = 3n + 5$ $\checkmark n = -\frac{4}{3}$ $\checkmark P_1 = -\frac{4}{3}$ (4)
		[15]



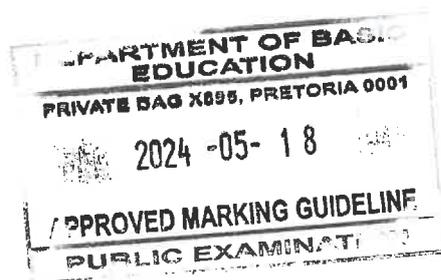
QUESTION 4/VRAAG 4

4.1	$x = 1$ $y = 2$	$\checkmark x = 1$ $\checkmark y = 2$ (2)
4.2		$\checkmark x$ -intercept $\checkmark y$ -intercept \checkmark asymptotes \checkmark shape (4)
4.3	$x < \frac{1}{2}$ or $x > 1$ or/of $\left(-\infty; \frac{1}{2}\right)$ or $(1; \infty)$	$\checkmark x < \frac{1}{2}$ $\checkmark x > 1$ (2)
4.4	$y = -(x-1) + 2$ $y = -x + 3$ OR/OF $y - 2 = -(x - 1)$ $y = -x + 3$ OR/OF $y = -x + c$ $2 = -(1) + c$ $c = 3$ $\therefore y = -x + 3$	$\checkmark m = -1$ \checkmark substitution of pt of intersection of the asymptotes (2) OR/OF $\checkmark m = -1$ \checkmark substitution of pt of intersection of the asymptotes (2) OR/OF $\checkmark m = -1$ \checkmark substitution of pt of intersection of the asymptotes (2)
		(2) [10]



QUESTIONS/VRAAG 5

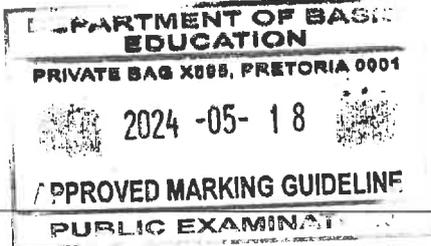
5.1	$P'(2;4)$	$\checkmark x = 2$ $\checkmark y = 4$	(2)
5.2	$f(x) = \log_a x$ $2 = \log_a 4$ $a^2 = 4$ $a = 2$	\checkmark substitute (4 ; 2) $\checkmark a^2 = 4$	(2)
5.3	$y = 2^x$	$\checkmark y = 2^x$	(1)
5.4	$1 = \log_2 x$ $\therefore x = 2$ T(2 ; 1) RT = 2 units P'T = 3 units Area of $\Delta RTP' = \frac{1}{2} \cdot RT \cdot TP'$ $= \frac{1}{2} \times 2 \times 3 = 3 \text{ units}^2$	$\checkmark x = 2$ $\checkmark RT = 2 \text{ units}$ $\checkmark P'T = 3 \text{ units}$ \checkmark answer	(4)
			[9]



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QUESTION 6/VRAAG 6

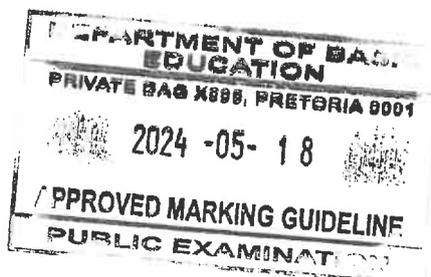
6.1	$y \geq -4$ or $y \in [-4; \infty)$	$\checkmark y \geq -4$ (1)
6.2	$x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $x = 3$ or $x = -1$ $\therefore E(3; 0)$ and $D(-1; 0)$	$\checkmark = 0$ \checkmark both x -values \checkmark correct identification of coordinates (3)
6.3	$P(0; -3)$ $\therefore m_g = 1$ $\therefore g(x) = x - 3$	$\checkmark m_g$ \checkmark equation (2)
6.4	$f(x) > g(x)$ $x < 0$ or $x > 3$	$\checkmark x < 0$ $\checkmark x > 3$ (2)
6.5	Distance $= -x^2 + 2x + 3 - x + 3 = -x^2 + x + 6$ $D' = -2x + 1 = 0$ or/of $x = -\frac{b}{2a} = -\frac{1}{2(-1)}$ $\therefore x = \frac{1}{2}$ $\therefore x = \frac{1}{2}$ $D\left(\frac{1}{2}\right) = -\left(\frac{1}{2}\right)^2 + \frac{1}{2} + 6$ $= \frac{25}{4} = 6,25$	$\checkmark -x^2 + 2x + 3$ \checkmark distance between graphs \checkmark method $\checkmark x$ -value \checkmark answer (5)
6.6	$f'(x) = m_g$ $2x - 2 = 1$ $x = \frac{3}{2}$ Point on f and k : $\left(\frac{3}{2}; \frac{-15}{4}\right)$ $k(x) = g(x) - n \therefore -\frac{15}{4} = \left(\frac{3}{2} - 3\right) - n$ $\therefore n = 2\frac{1}{4} = \frac{9}{4} = 2,25$ OR/OF $f(x) = k(x)$ $x^2 - 2x - 3 = x - 3 - n$ $x^2 - 3x + n = 0$ $\Delta = b^2 - 4ac$ $= (-3)^2 - 4(1)(n)$ To touch: $\Delta = 0$ $0 = 9 - 4n$ $4n = 9$ $n = \frac{9}{4} = 2,25$	$\checkmark 2x - 2 = 1$ $\checkmark x = \frac{3}{2}$ $\checkmark \frac{-15}{4}$ $\checkmark -\frac{15}{4} = \left(\frac{3}{2} - 3\right) - n$ \checkmark answer (5) OR/OF \checkmark equating \checkmark standard form \checkmark substitution into Δ $\checkmark \Delta = 0$ \checkmark answer (5)



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QUESTION 7/VRAAG 7

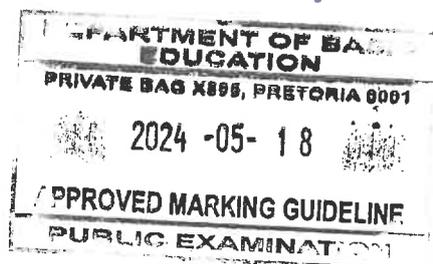
<p>7.1</p>	$A = P(1 - i)^n$ $8\,337,75 = 13\,000(1 - i)^6$ $i = 0,0714 \dots$ $r = 7,14\%$	<p>✓ correct formula</p> <p>✓ substitution</p> <p>✓ answer</p> <p style="text-align: right;">(3)</p>
<p>7.2</p>	$F = \frac{x \left[(1 + i)^n - 1 \right]}{i}$ $80\,000 = \frac{x \left[\left(1 + \frac{8,6}{1200} \right)^{36} - 1 \right]}{\frac{8,6}{1200}}$ $x = R1\,955,78$ <p>Thandi's total = $1\,955,78 \times 36 = R\,70\,408,08$ Eric's total = $1\,402,31 \times 48 = R\,67\,310,88$ Difference = $70\,408,08 - 67\,310,88$ = R3 097,20</p>	<p>✓ i</p> <p>✓ substitution into correct formula</p> <p>✓ answer</p> <p>✓ answer</p> <p style="text-align: right;">(4)</p>
<p>7.3</p>	$225\,000 \left(1 + \frac{0,09}{12} \right)^3 = \frac{5\,500 \left[1 - \left(1 + \frac{0,09}{12} \right)^{-n} \right]}{\frac{0,09}{12}}$ $0,3137734959\dots = 1 - \left(1 + \frac{0,09}{12} \right)^{-n}$ $\left(1 + \frac{0,09}{12} \right)^{-n} = 0,6862265041\dots$ $-n = \log_{\left(1 + \frac{0,09}{12} \right)} 0,6862265041\dots$ $n = 50,394375\dots$ $n = 51$	<p>✓ i</p> <p>✓ substitution into A-formula</p> <p>✓ $n = 3$ into A-formula</p> <p>✓ substitution into P_v-formula</p> <p>✓ correct use of logs</p> <p>✓ $n = 51$</p> <p style="text-align: right;">(6)</p>
[13]		



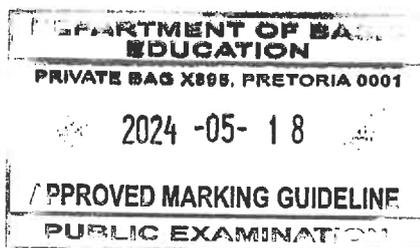
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QUESTION8/VRAAG 8

<p>8.1</p> $f(x) = \frac{1}{x}$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{\frac{1}{x+h} - \frac{1}{x}}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{x - (x+h)}{x(x+h)} \times \frac{1}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-h}{x(x+h)} \times \frac{1}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-1}{x(x+h)}$ $f'(x) = -\frac{1}{x^2}$ <p>OR/OF</p> $f(x) = \frac{1}{x}$ $f(x+h) = \frac{1}{x+h}$ $f(x+h) - f(x) = -\frac{h}{x(x+h)}$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-h}{x(x+h)} \times \frac{1}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{-1}{x(x+h)}$ $f'(x) = -\frac{1}{x^2}$	$\checkmark f(x+h) = \frac{1}{x+h}$ $\checkmark \frac{\frac{1}{x+h} - \frac{1}{x}}{h}$ $\checkmark \frac{-h}{x(x+h)} \times \frac{1}{h}$ $\checkmark \frac{-1}{x(x+h)}$ $\checkmark \text{answer}$ <p style="text-align: right;">(5)</p> <p>OR/OF</p> $\checkmark f(x+h) = \frac{1}{x+h}$ $\checkmark f(x+h) - f(x) = -\frac{h}{x(x+h)}$ $\checkmark \frac{-h}{x(x+h)} \times \frac{1}{h}$ $\checkmark \frac{-1}{x(x+h)}$ $\checkmark \text{answer}$ <p style="text-align: right;">(5)</p>
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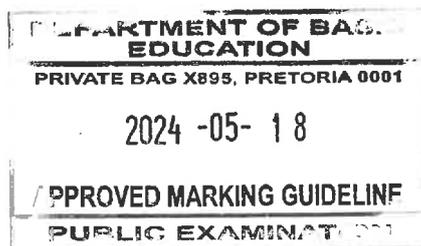


8.2.1	$\frac{d}{dx}(\sqrt{4x^6} + \sqrt{2} \cdot x^2)$ $= \frac{d}{dx}(2x^3 + \sqrt{2} \cdot x^2)$ $= 6x^2 + 2\sqrt{2}x$	$\checkmark 2x^3$ $\checkmark 6x^2$ $\checkmark 2\sqrt{2}x$ (3)
8.2.2	$g(x) = \frac{3x^4 - 4x^2 + 6}{x^2}$ $g(x) = 3x^2 - 4 + 6x^{-2}$ $g'(x) = 6x - 12x^{-3}$	$\checkmark 3x^2 - 4 + 6x^{-2}$ $\checkmark 6x$ $\checkmark -12x^{-3}$ (3)
8.3	$f(x) = 3x^2 + bx + c$ $f'(x) = 6x + b$ $f'(1) = 6 + b = 9$ $\therefore b = 3$ $f(1) = 3 + 3 + c = 0$ $c = -6$ $\therefore f(x) = 3x^2 + 3x - 6$	$\checkmark f'(1) = 6 + b = 9$ $\checkmark b = 3$ $\checkmark f(1) = 3 + 3 + c = 0$ \checkmark value of c (4)
		[15]

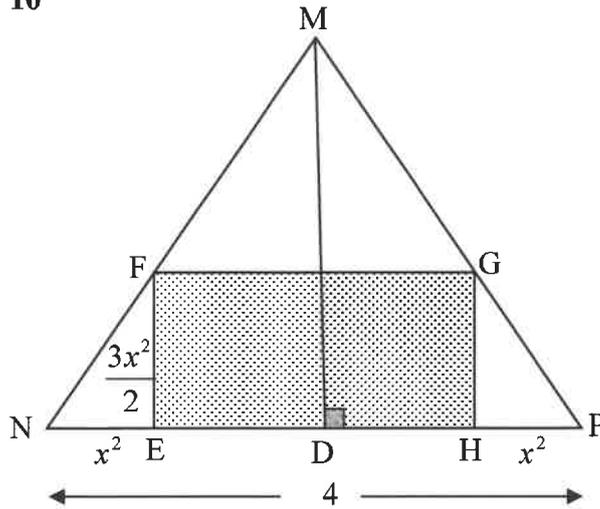


QUESTION9/VRAAG 9

<p>9.1</p>	<p>$f(x) = ax^3 + bx^2 + cx - 5$ $-5 = a(0+1)^2(0-5)$ $-5 = -5a$ $a = 1$ $f(x) = (x+1)(x+1)(x-5)$ $f(x) = (x^2 + 2x + 1)(x-5)$ $f(x) = x^3 - 3x^2 - 9x - 5$ $\therefore b = -3$ and $c = -9$</p>	<p>✓ $(x+1)^2$ ✓ $f(x) = a(x+1)^2(x-5)$ ✓ substitution $(0 ; -5)$</p> <p style="text-align: right;">(3)</p>
<p>9.2</p>	<p>$f(x) = x^3 - 3x^2 - 9x - 5$ $f'(x) = 3x^2 - 6x - 9$ $x^2 - 2x - 3 = 0$ $(x-3)(x+1) = 0$ $x = 3$ or $x = -1$ Minimum value at $x = 3$</p>	<p>✓ $f'(x) = 3x^2 - 6x - 9$ ✓ $f'(x) = 0$ ✓ factors</p> <p>✓ $x = 3$</p> <p style="text-align: right;">(4)</p>
<p>9.3</p>	<p>$f''(x).f(x) > 0$ Point of inflection: $x = 1$ $x < 1 ; x \neq -1$ or $x > 5$</p>	<p>✓ $x < 1$ ✓ $x \neq -1$ ✓ $x > 5$</p> <p style="text-align: right;">(3)</p>
<p>9.4</p>	<p>$-32 < -t < -5$ $5 < t < 32$</p> <p>OR/OF</p> <p>Shift up less than 32 units $\therefore 5 < t < 32$</p>	<p>✓ -32 ✓ $-32 < -t < -5$ ✓ $5 < t < 32$</p> <p style="text-align: right;">(3)</p> <p>OR/OF</p> <p>✓ less than 32 units ✓ $5 < t < 32$</p> <p style="text-align: right;">(3)</p>
		[13]



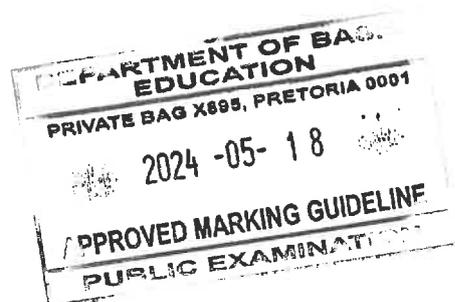
QUESTION 10/VRAAG 10



<p>10.1</p>	$\frac{NE}{EF} = \frac{2}{3} = \frac{x^2}{b}$ $3x^2 = 2b$ $\therefore b = \frac{3x^2}{2}$ $EH = 4 - 2x^2$ $\text{Area EFGH} = (4 - 2x^2) \left(\frac{3x^2}{2} \right)$ $A(x) = 6x^2 - 3x^4$ <p>OR/OF</p> <p>In $\triangle DMP$: $\tan P = \frac{3}{2}$</p> <p>In $\triangle HGP$: $\tan P = \frac{GH}{x^2}$</p> $\frac{GH}{x^2} = \frac{3}{2}$ $\therefore b = \frac{3x^2}{2}$ $EH = 4 - 2x^2$ $\text{Area EFGH} = (4 - 2x^2) \left(\frac{3x^2}{2} \right)$ $A(x) = 6x^2 - 3x^4$	$\checkmark \frac{NE}{EF} = \frac{2}{3} = \frac{x^2}{b}$ $\checkmark b = \frac{3x^2}{2}$ $\checkmark EH = 4 - 2x^2$ $\checkmark (4 - 2x^2) \left(\frac{3x^2}{2} \right)$ <p style="text-align: right;">(4)</p> <p>OR/OF</p> $\checkmark \frac{GH}{x^2} = \frac{3}{2}$ $\checkmark b = \frac{3x^2}{2}$ $\checkmark EH = 4 - 2x^2$ $\checkmark (4 - 2x^2) \left(\frac{3x^2}{2} \right)$ <p style="text-align: right;">(4)</p>
<p>10.2</p>	$A(x) = 6x^2 - 3x^4$ $A'(x) = 12x - 12x^3 = 0$ $12x(1 - x^2) = 0$ $\therefore x \neq 0 \text{ or } x = -1 \text{ or } x = 1$ $\therefore \text{max area: } A(1) = 6(1)^2 - 3(1)^4 = 3 \text{ cm}^2$	$\checkmark 12x - 12x^3$ $\checkmark A'(x) = 0$ $\checkmark \text{selection of } x = 1$ $\checkmark \text{answer}$ <p style="text-align: right;">(4)</p>
		<p>[8]</p>

QUESTION 11/VRAAG 11

11.1	$P(A) + P(B) = 0,52$ $0,4 + P(B) = 0,52$ $P(B) = 0,12$	✓ substitution into rule ✓ answer (2)
11.2.1	$P(\text{sandwich}) = \frac{4}{25} = 0,16$ OR/OF $0,02 + 0,01 + 0,04 + 0,09 = \frac{4}{25} = 0,16$	✓ $\frac{4}{25} = 0,16$ OR/OF ✓ $\frac{4}{25} = 0,16$ (1) (1)
11.2.2	$P(\text{at least two events}) = 0,02 + 0,01 + 0,03 + 0,04 = 0,1$	✓✓ $0,02 + 0,01 + 0,03 + 0,04$ (2)
11.2.3	$P(\text{not any}) = 1 - (0,02 + 0,01 + 0,03 + 0,04 + 0,04 + 0,09 + 0,2) = 0,57$	✓ complementary rule ✓ 0,57 (2)
11.3.1	$7! = 5040$	✓ 7! (1)
11.3.2	$P(4 \text{ players alphabetically}) = \frac{1}{7 \times 6 \times 5 \times 4} = \frac{1}{840}$	✓✓ 840 ✓ $\frac{1}{840}$ (3)



<p>11.3.3</p>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">F</td> <td style="width: 20px;"></td> <td style="text-align: center;">F</td> <td style="width: 20px;"></td> <td style="text-align: center;">F</td> <td style="width: 20px;"></td> <td style="text-align: center;">F</td> </tr> </table> <p>F arrangements: 4! M arrangements: 5 options with 3 males = $5 \times 4 \times 3$</p> <p>$4! \times 5 \times 4 \times 3$ = 1 440</p> <p>OR/OF</p> <p>10 Options: F M F M F M F M F M F M F F F F M F M F M F M F M F F M M F M F F M F M F M F F F M F M F F M F M M F F M F F M M F F M F M F M F F F M F M</p> <p>Hence $10 \times 4! \times 3! = 1440$</p>	F		F		F		F	<p>$\checkmark 5 \times 4 \times 3$ $\checkmark \checkmark 4! \times 5 \times 4 \times 3$</p> <p style="text-align: right;">(3)</p> <p>OR/OF</p> <p>$\checkmark 10$ $\checkmark \checkmark 10 \times 4! \times 3!$</p> <p style="text-align: right;">(3)</p>
F		F		F		F			
		[14]							
TOTAL/TOTAAL: 150									

