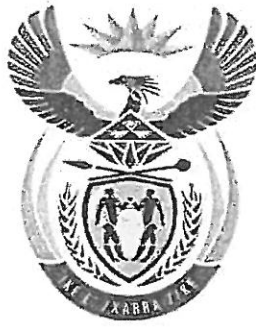


A. Slaughter



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE SENIOR
SERTIFIKAAT**

GRADE 12/GRAAD 12

MATHEMATICS P1/WISKUNDE VI
NOVEMBER 2018
MARKING GUIDELINES/NASIENRIGLYNE

**MARKS: 150
PUNTE: 150**

DEPARTMENT OF BASIC
EDUCATION
PRIVATE BAG X895, PRETORIA 0001
2018 -11- 04
APPROVED MARKING GUIDELINE
PUBLIC EXAMINATION

These marking guidelines consist of 18 pages.
Hierdie nasienriglyne bestaan uit 18 bladsye

*APPROVED
UMALUSI
04/11/2018*

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04-11-2018*

*APPROVED
4/11/2018*

*APPROVED
2018-11-04*

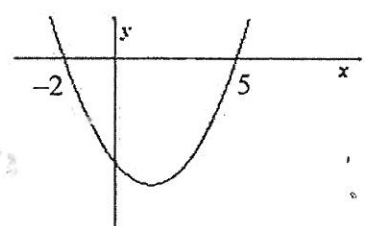
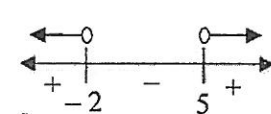
NOTE:

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

LET WEL:

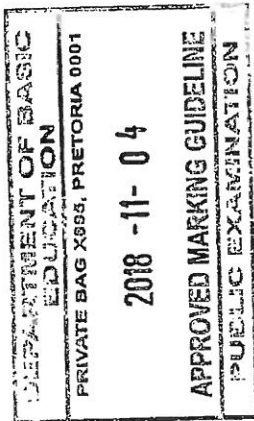
- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.

QUESTION/VRAAG 1

<p>1.1.1</p> <p><i>don't put in class before</i></p>	<p>$x^2 - 4x + 3 = 0$</p> <p>$(x-3)(x-1) = 0$ ✓</p> <p>$x = 3$ or $x = 1$ ✓ ✓</p> <p><i>wrong factors correct answers 0/3</i></p> <p><i>CA from any factors</i></p> <p><i>wrong factors correct answers 0/3</i></p> <p><i>oo 2/3</i></p>	<p>✓ factors/correct sub in formula</p> <p>✓ $x = 3$</p> <p>✓ $x = 1$</p> <p>(3)</p>
<p>1.1.2</p> <p><i>don't need to put in class</i></p> <p><i>Sub into formula</i></p>	<p>$5x^2 - 5x + 1 = 0$</p> <p>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$</p> <p>$= \frac{5 \pm \sqrt{25 - 4(5)(1)}}{2(5)}$ ✓</p> <p>$= \frac{5 \pm \sqrt{5}}{10}$</p> <p>$x = 0,72$ or $x = 0,28$ ✓ ✓</p> <p><i>rounding</i></p> <p><i>oo 3/3</i></p> <p><i>5^2 → 25</i></p> <p><i>3 soln 4/3</i></p> <p><i>oo 0/3</i></p>	<p>✓ substitution into the correct formula</p> <p>✓ $x = 0,72$</p> <p>✓ $x = 0,28$</p> <p>(3)</p>
<p>1.1.3</p> <p><i>ignore numbers after</i></p> <p><i>now use before</i></p> <p><i>answer ans</i></p>	<p>$x^2 - 3x - 10 > 0$</p> <p>$(x-5)(x+2) > 0$ ✓ factors ↔ 5 ; -2</p> <p>OR/OF</p>   <p>$x < -2$ or $x > 5$ ✓ ✓</p> <p><i>whole unit</i></p> <p><i>XX or > 2 or > 5 1/3</i></p> <p><i>oo 3/3</i></p> <p><i>or answer at ; or</i></p> <p><i>ans = 1 2/3</i></p> <p><i>or incorrect factor</i></p>	<p>✓ factors/ critical values</p> <div data-bbox="1133 1422 1556 1680" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DEPARTMENT OF BASIC EDUCATION</p> <p>PRIVATE BAG X995, PRETORIA 0001</p> <p>2018 -11- 04</p> <p>APPROVED MARKING GUIDELINE</p> <p>PUBLIC EXAMINATION</p> </div> <p>✓ ✓ $x < -2$ or $x > 5$</p> <p>(3)</p>
<p>1.1.4</p>	<p>$3\sqrt{x} = x - 4$</p> <p>$9x = x^2 - 8x + 16$</p> <p>$x^2 - 17x + 16 = 0$</p> <p>$(x-16)(x-1) = 0$</p> <p>$x = 16$ or $x = 1$</p> <p>NA</p> <p><i>now is 11^2 and 3^2 idon</i></p> <p><i>& sq immediately</i></p> <p><i>oo 3/3</i></p> <p><i>or correct b/d</i></p>	<p>✓ squaring both sides method</p> <p>✓ $x^2 - 17x + 16 = 0$</p> <p>✓ factors</p> <p>✓ answer with selection</p> <p>(4)</p>

Handwritten signatures and initials at the bottom of the page.

	<p>OR/OF</p> $3x^{\frac{1}{2}} = x - 4$ $x - 3x^{\frac{1}{2}} - 4 = 0$ $\begin{pmatrix} 1 \\ x^2 - 4 \end{pmatrix} \begin{pmatrix} 1 \\ x^2 + 1 \end{pmatrix} = 0$ $x^{\frac{1}{2}} = 4 \quad \text{or} \quad x^{\frac{1}{2}} = -1$ $x = 16 \quad \text{NA}$ <p><i>variable $x^{\frac{1}{2}}$</i> <i>factors</i> <i>CA bit check</i> <i>CA 1 or reject -4 reject 3/4</i></p>	<p>OR/OF</p> <ul style="list-style-type: none"> ✓ standard form ✓ recognize $x = \left(x^{\frac{1}{2}}\right)^2$ ✓ factors ✓ answer with selection <p>(4)</p>
<p>1.2</p>	<p>$2y + 9x^2 = -1 \dots\dots(1)$ $3x - y = 2 \dots\dots (2)$ $y = 3x - 2 \dots\dots(3)$ $2(3x - 2) + 9x^2 = -1$ $6x - 4 + 9x^2 = -1$ $9x^2 + 6x - 3 = 0$ $3x^2 + 2x - 1 = 0$ $(3x - 1)(x + 1) = 0$ $x = \frac{1}{3} \quad \text{or} \quad x = -1$ $y = -1 \quad \text{or} \quad y = -5$</p> <p><i>linear b/d ∴ 2/6</i> <i>either ✓ = 2y b/d</i> <i>both</i> <i>both</i></p> <p>OR/OF</p> $2y + 9x^2 = -1 \dots\dots(1)$ $3x - y = 2 \dots\dots (2)$ $x = \frac{y + 2}{3}$ $2y + 9\left(\frac{y + 2}{3}\right)^2 = -1$ $2y + 9\left(\frac{y^2 + 4y + 4}{9}\right) = -1$ $2y + y^2 + 4y + 4 + 1 = 0$ $y^2 + 6y + 5 = 0$ $(y + 5)(y + 1) = 0$ $y = -1 \quad \text{or} \quad y = -5$ $x = \frac{1}{3} \quad \text{or} \quad x = -1$ <p><i>(x+1)(x+1) = 0 x=</i> <i>y = correct 2/6</i></p>	<p>✓ $y = 3x - 2$ ✓ substitution</p> <p>✓ standard form ✓ factors ✓ both x values ✓ both y values</p> <p>(6)</p> <p>OR/OF</p> <ul style="list-style-type: none"> ✓ $x = \frac{y + 2}{3}$ ✓ substitution ✓ standard form ✓ factors ✓ both y values ✓ both x values <p>(6)</p>



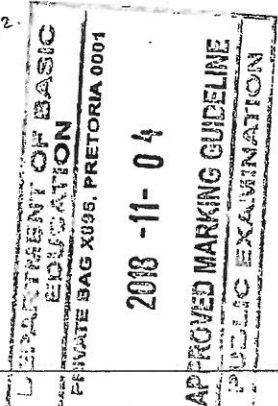
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<p>1.3</p>	<p> $3^{9x} = 64$ $(3^{3x})^3 = (4)^3$ $3^{3x} = 4$ ✓ </p> <p> $5^{\sqrt{p}} = 64$ $\sqrt{5^{\sqrt{p}}} = \sqrt{64}$ ✓ $\sqrt{5^{\sqrt{p}}} = 8$ ✓ </p> <p> $\frac{[3^{x-1}]^3}{\sqrt{5^{\sqrt{p}}}} = \frac{3^{3x-3}}{\sqrt{5^{\sqrt{p}}}}$ $= \frac{3^{3x}}{27 \times \sqrt{5^{\sqrt{p}}}}$ $= \frac{4}{27 \times 8}$ $= \frac{1}{54}$ ✓ </p> <p> OR/OF $\frac{(3^{x-1})^3}{\sqrt{5^{\sqrt{p}}}} = \frac{3^{3x} \cdot 3^{-3}}{(5^{0.5})^{\sqrt{p}}}$ $= \frac{3^{3x} \cdot 3^{-3}}{(5^{\sqrt{p}})^{0.5}}$ $= \frac{4 \cdot 3^{-3}}{\sqrt{64}}$ $= \frac{4 \cdot \frac{1}{27}}{8} = \frac{1}{54}$ </p> <p> $(3^{9x})^{\frac{1}{3}} = (64)^{\frac{1}{3}}$ $3^{3x} = (4)^{\frac{1}{3}}$ $= 4$ </p> <p> $5^{\frac{\sqrt{p}}{2}} = 8$ </p> <p> OR/OF $= \frac{3^{3x} \cdot 3^{-3}}{5^{\frac{\sqrt{p}}{2}}}$ $= \frac{\sqrt[3]{64} \cdot 3^{-3}}{\sqrt{64}}$ </p>	<p> ✓ $3^{3x} = 4$ ✓ $\sqrt{5^{\sqrt{p}}} = 8$ ✓ 3^{3x-3} or $3^{3x} \cdot 3^{-3}$ ✓ answer (4) </p> <p> OR/OF ✓ 3^{3x-3} or $3^{3x} \cdot 3^{-3}$ ✓ $3^{3x} = 4$ ✓ $\sqrt{5^{\sqrt{p}}} = 8$ ✓ answer (4) </p> <p>[23]</p>
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 APPROVED MARKING GUIDELINE
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QUESTION/VRAAG 2

2.1.1	42 ✓	✓ answer (1)
2.1.2	$2a = 6$ $a = 3$ ✓ $3a + b = 1$ $3(3) + b = 1$ $b = -8$ ✓ $a + b + c = 2$ $(3) + (-8) + c = 2$ $c = 7$ ✓ $T_n = 3n^2 - 8n + 7$ ✓ OR/OF $2a = 6$ $a = 3$ $T_n = 3n^2 + bn + c$ $T_1: 3 + b + c = 2$ $T_2: 12 + 2b + c = 3$ $T_2 - T_1: b = -8$ Subst. in (1): $-8 + c = -1$ $c = 7$ $T_n = 3n^2 - 8n + 7$	✓ $a = 3$ ✓ $b = -8$ ✓ $c = 7$ ✓ $T_n = an^2 + bn + c$ or with ... OR/OF ✓ $a = 3$ ✓ $b = -8$ ✓ $c = 7$ ✓ $T_n = an^2 + bn + c$ (4)
2.1.3	$T_{20} = 3(20)^2 - 8(20) + 7$ $= 1047$	✓ substitution ✓ answer (2)
2.2	$T_n = -7n + 42$ ✓ $-7n + 42 = -140$ ✓ $-7n = -182$ $n = 26$ ✓ Trial + error ✓	$T_n = 35 + (n-1)(-7)$ ✓ $T_n = -7n + 42$ ✓ $-7n + 42 = -140$ ✓ $n = 26$ (3)
2.3	$S_n = \frac{n}{2}(a+l)$ $S_n = \frac{n}{2}(35 - 7n + 42)$ $S_n = \frac{n}{2}(-7n + 77)$ $S_n = -\frac{7}{2}n^2 + \frac{77}{2}n$ $-\frac{7}{2}n^2 + \frac{77}{2}n = 3n^2 - 8n + 7$ $13n^2 - 93n + 14 = 0$ $(n-7)(13n-2) = 0$ $n = 7$ or $n = \frac{2}{13}$ NA $\therefore n = 7$ ✓	OR/OF $S_n = \frac{n}{2}[2a + (n-1)d]$ $S_n = \frac{n}{2}(70 - 7n + 7)$ ✓ $S_n = \frac{n}{2}(35 - 7n + 42)$ or $S_n = \frac{n}{2}(70 - 7n + 7)$ ✓ simplification of S_n ✓ equating ✓ standard form ✓ factors ✓ answer with selection (6)
		[16]



QUESTION/VRAAG 3

<p>3.1</p>	<p> $r = \frac{1}{2}$ and $S_{\infty} = 6$ $S_{\infty} = \frac{a}{1-r}$ $6 = \frac{a}{1-\frac{1}{2}}$ $a = 3$ </p> <p> <i>Handwritten:</i> $6 = \frac{a(1-\frac{1}{2})^n - 1}{-\frac{1}{2}}$ <i>Handwritten:</i> $6 = \frac{a(1-\frac{1}{2})^n - 1}{-\frac{1}{2}}$ <i>Handwritten:</i> $6 = \frac{a(1-\frac{1}{2})^n - 1}{-\frac{1}{2}}$ <i>Handwritten:</i> $6 = \frac{a(1-\frac{1}{2})^n - 1}{-\frac{1}{2}}$ </p>	<p> ✓ substitution S_{∞} ✓ answer </p> <p>(2)</p>
<p>3.2</p>	<p> $T_n = ar^{n-1}$ $T_8 = 3\left(\frac{1}{2}\right)^7$ $T_8 = \frac{3}{128}$ </p> <p> <i>Handwritten:</i> $3\left(\frac{1}{2}\right)^8$ $\frac{3}{256}$ <i>Handwritten:</i> $3\left(\frac{1}{2}\right)^7$ $\frac{3}{128}$ <i>Handwritten:</i> $0,02$ </p>	<p> ✓✓ $T_8 = 3\left(\frac{1}{2}\right)^7$ </p> <p>(2)</p>
<p>3.3</p>	<p> $\sum_{k=1}^n 3(2)^{1-k} = 5,8125$ $3 + \frac{3}{2} + \frac{3}{4} + \dots = 5,8125$ $S_n = \frac{a(1-r^n)}{1-r} = 5,8125$ $\frac{3\left[1 - \left(\frac{1}{2}\right)^n\right]}{1 - \frac{1}{2}} = 5,8125$ $6\left[1 - \left(\frac{1}{2}\right)^n\right] = 5,8125$ $\left(\frac{1}{2}\right)^n = \frac{1}{32} = 0,03125$ <i>simp</i> $2^{-n} = 2^{-5}$ or $n \log \frac{1}{2} = \log \frac{1}{32}$ $n = 5$ </p> <p> <i>Handwritten:</i> $r = \frac{1}{2}$ ✓ <i>Handwritten:</i> $3 + \frac{3}{2} + \frac{3}{4} + \dots = 5,8125$ <i>Handwritten:</i> $\frac{1}{32} = 0,03125$ <i>Handwritten:</i> $2^{-n} = 2^{-5}$ or $n \log \frac{1}{2} = \log \frac{1}{32}$ <i>Handwritten:</i> $n = 5$ <i>Handwritten:</i> $r = \frac{1}{2}$ <i>Handwritten:</i> $(\frac{1}{2})^n = \frac{47}{16}$ <i>Handwritten:</i> $n = 1,55$ <i>Handwritten:</i> $n = 2$ <i>Handwritten:</i> $n = 3$ <i>Handwritten:</i> $n = 4$ <i>Handwritten:</i> $n = 5$ </p>	<p> ✓ $r = \frac{1}{2}$ ✓ substitution ✓ simplification ✓ answer </p> <p>(4)</p>

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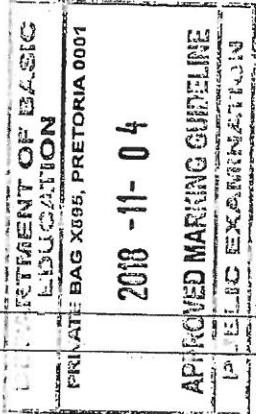
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 CP

<p>3.4</p>	$\sum_{k=1}^{20} 3(2)^{1-k} = p$ $3 + \frac{3}{2} + \frac{3}{4} + \dots + 3 \cdot 2^{-19} = p$ $\sum_{k=1}^{20} 24(2)^{-k}$ $= 12 + 6 + 3 + \dots + 24 \cdot 2^{-20}$ $= 4 \left(3 + \frac{3}{2} + \frac{3}{4} + \dots + 3 \cdot 2^{-19} \right) \checkmark$ $= 4p \checkmark$ <p><i>OR/OF</i></p> $\sum_{k=1}^{20} 3(2)^{1-k} = p$ $\sum_{k=1}^{20} 6(2)^{-k} = p$ $\therefore \sum_{k=1}^{20} 24(2)^{-k} = 4p$ <p><i>OR/OF</i></p> $\sum_{k=1}^{20} 24(2)^{-k} = \sum_{k=1}^{20} 4 \times 3 \times 2(2)^{-k}$ $= 4 \sum_{k=1}^{20} 3 \times 2(2)^{-k}$ $= 4 \sum_{k=1}^{20} 3 \times (2)^{1-k} = 4p$ <p><i>OR/OF</i></p> $S_{20} = \frac{3 \left(\left(\frac{1}{2} \right)^{20} - 1 \right)}{\frac{1}{2} - 1} = 6 = p$ $S_{20} = \frac{12 \left(\left(\frac{1}{2} \right)^{20} - 1 \right)}{\frac{1}{2} - 1} = 24$ $24 = 4 \times 6 = 4p$	<p>\checkmark expansion</p> <p>\checkmark expansion</p> <p>\checkmark answer (3)</p> <p><i>OR/OF</i></p> <p>$\checkmark \sum_{k=1}^{20} 6(2)^{-k} = p$</p> <p>$\checkmark \sum_{k=1}^{20} 4 \times 6(2)^{-k}$</p> <p>$\checkmark 4p$ (3)</p> <p><i>OR/OF</i></p> <p>$\checkmark \sum_{k=1}^{20} 4 \times 3 \times 2(2)^{-k}$</p> <p>$\checkmark 4 \sum_{k=1}^{20} 3 \times 2(2)^{-k}$</p> <p>$\checkmark 4p$ (3)</p> <p><i>OR/OF</i></p> <p>\checkmark substitution and answer</p> <p>\checkmark substitution and answer</p> <p>$\checkmark 4p$ (3)</p>
		(3)
		[11]

NOTES p 18 option 10

QUESTION/VRAAG 4

4.1	<p>Yes ✓ <i>from 1</i></p> <p>For every x-value there is only one corresponding y value</p> <p>OR/OF</p> <p>One to one mapping (vertical line test)</p>	<p>✓ answer</p> <p>✓ reason</p>	(2)
4.2	<p>R(-12; -6) ✓</p>	<p>✓ answer</p>	(1)
4.3	<p>$f(x) = ax^2$ substitute (-6; -12)</p> <p>$-12 = a(-6)^2$ ✓</p> <p>$a = \frac{-1}{3}$ ✓</p>	<p>✓ substitution P</p> <p>✓ answer</p>	(2)
4.4	<p>$f: y = -\left(\frac{1}{3}\right)x^2$</p> <p>$f^{-1}: x = -\left(\frac{1}{3}\right)y^2$ ✓ <i>any one of</i></p> <p>$y^2 = -3x$ ✓ <i>any one of</i></p> <p>$y = \pm\sqrt{-3x}$</p> <p>Only $y = -\sqrt{-3x}$ and $x \leq 0$</p>	<p>✓ changing x and y</p> <p>✓ $y^2 = -3x$</p> <p>✓ $y = -\sqrt{-3x}$</p>	(3)
			[8]



08

QUESTION/VRAAG 5

5.1	<p>Domain: $x \in R; x \neq 1$ ✓</p> <p>OR/OF</p> <p>$x \in (-\infty; 1) \cup (1; \infty)$</p>	<p>✓ answer</p>	(1)
5.2	<p>$x = 1$ ✓</p> <p>$y = 0$ ✓ <i>x-axis OK</i></p>	<p>✓ $x = 1$</p> <p>✓ $y = 0$</p>	(2)
5.3		<p>✓ y intercept</p> <p>✓ vertical asymptote</p> <p>✓ shape = ha</p> <p>✓ 1 arm 2/3 max</p>	(3)
5.4	<p>$x \geq 0; x \neq 1$ ✓</p> <p>OR/OF</p> <p>$0 \leq x < 1$ or $x > 1$</p> <p>OR/OF</p> <p>$x \in [0; 1) \cup (1; \infty)$</p>	<p>✓ $x \geq 0$</p> <p>✓ $x \neq 1$</p> <p>OR/OF</p> <p>✓ $0 \leq x < 1$</p> <p>✓ $x > 1$</p>	(2)
			[8]

1
2
3
2
1

Handwritten signatures and initials: MS, CP, and other marks.

20

QUESTION/VRAAG 6

calc m !!

<p>6.1</p>	<p>$y = mx + c$ $m = \frac{5-1}{4-0}$ ✓ sub $m = 1$ ✓ ans $c = 1$ ✓ stated or $g(x) = x + 1$ OR/OF $y = mx + c$ $5 = m(4) + 1$ ✓ c and ✓ sub $m = 1$ $g(x) = x + 1$</p> <p><i>(0; 1) (4; 5)</i> $y - 1 = m(x - 0)$ ✓ $5 - 1 = m(4 - 0)$ ✓ $1 = m$ ✓ mark show <i>calc A from f A(-1; 0)</i> <i>together</i> <i>one given</i></p>	<p>✓ substitution into gradient formula ✓ y-intercept (0; 1) (2) OR/OF ✓ substitute (4; 5) ✓ c = 1 (2)</p>
<p>6.2</p>	<p>$x^2 - 2x - 3 = 0$ ✓ y=0 $(x+1)(x-3) = 0$ ✓ factors (to show) $x = -1$ or $x = 3$ ✓ CA A(-1; 0) B(3; 0) ✓</p> <p><i>no need to be identified as A or B</i></p>	<p>✓ $y = 0$ $\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-3)}}{2(1)}$ ✓ factors ✓ x-values (3)</p>
<p>6.3</p>	<p>$x = \frac{-1+3}{2}$ or $x = \frac{-b}{2a} = \frac{-(-2)}{2(1)}$ or $f'(x) = 2x - 2 = 0$ $x = 1$ ✓ set $f(x) = x^2 - 2x - 3$ $y = (1)^2 - 2(1) - 3$ ✓ sub $y = -4$ $y \geq -4$ ✓ or $[-4; \infty)$</p> <p><i>q: $\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$ rules w/ bd 1/3</i> <i>ctd</i> $y = (x^2 - 2x + (-1)^2) - 3 - 1$ $= (x-1)^2 - 4$ <i>should have y0 [-4; 0)</i></p>	<p>✓ x-value ✓ substitution/ completing the square ✓ answer (3)</p>
<p>6.4.1</p>	<p>MN: $y = (x^2 - 2x - 3) - (x + 1)$ $= x^2 - 3x - 4$ ✓ $6 = x^2 - 3x - 4$ ✓ $\rightarrow 0 = x^2 - 3x - 10$ no mark $0 = (x-5)(x+2)$ no mark $x = 5$ or $x = -2$ ✓ OT = 2 or OT = 5 NA</p> <p><i>0 = x^2 - 3x - 4 ✓ 1/4 stop bld</i> <i>0 = x^2 - 3x - 2 ✓ 1/4</i> <i>0 = x^2 - 3x - 8 ✓ 1/4</i> <i>x = 4,70 or -1,70 ✓ 1/4</i> <i>OT = 1,70 ✓ 1/4</i> <i>0 = x^2 - 2x - 3 ✓ 1/4</i> <i>0 = x^2 - 2x - 6 ✓ 1/4</i> <i>x = 2 or -2 ✓ 1/4</i> <i>OT = 2 ✓ 1/4</i></p>	<p>✓ $x^2 - 3x - 4$ ✓ substituting $y = 6$ ✓ values of x ✓ OT = 2 (4)</p>
<p>6.4.2</p>	<p>$y = x + 1$ substitute $x = -2$ $= (-2) + 1$ ✓ $= -1$ ✓ N(-2; -1) ✓</p> <p><i>CA using x = -2 value</i> <i>OT from 6.4.1</i> <i>no necessary</i></p>	<p>✓ substituting $x = -2$ ✓ answer (2)</p>

2

3

3

4

2

a.o. x = -1 or 3 2/3 y = 0 missing (-1; 0) (3; 0) 3/2

a.o. y = -4 2/3

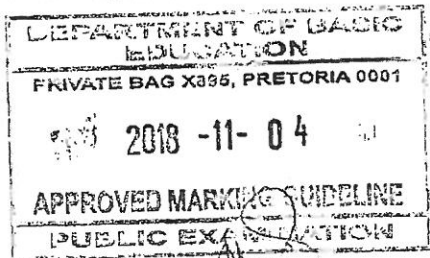
a.o. 3/3

a.o. 1/4

a.o. OT = 2 1/4

a.o. 6 = x^2 - 2x - 3 x 0/4

• both sets +
 • bld 0/2
 • Whether 6.4.1 attempted or not, if 6.4.2 is a.o. (-2; -1) 2/3

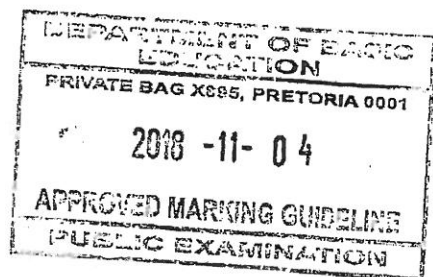


• (x)
 ↑ only CA y if x is CA'd correctly from OT PTO

<p>6.5</p>	<p> $f'(x) = 2x - 2$ ✓ $2x - 2 = 1$ ✓ $f' = m_g$ $x = \frac{3}{2}$ ✓ $f\left(\frac{3}{2}\right) = \frac{-15}{4}$ ✓ $-3,75$ $y + \frac{15}{4} = 1\left(x - \frac{3}{2}\right)$ or $-\frac{15}{4} = \frac{1}{2} + c$ $y = x - \frac{21}{4}$ ✓ ans <hr/> OR/OF $x^2 - 2x - 3 = x + p$ ✓ $x^2 - 2x - 3 - x - p = 0$ This equation will have equal roots, therefore: $b^2 - 4ac = 0$ ✓ $\Delta = 0$ ✓ $(-3)^2 - 4(1)(-3 - p) = 0$ ✓ $sub \Delta$ $9 + 12 + 4p = 0$ ✓ $p = \frac{-21}{4}$ $y = x - \frac{21}{4}$ ✓ $-5,25$ </p>	<p> $f'(x) = 2x - 2$ ✓ $2x - 2 = 1$ ✓ $x = \frac{3}{2}$ ✓ $f\left(\frac{3}{2}\right) = \frac{-15}{4}$ ✓ ans ✓ (5) </p> <p> OR/OF \checkmark equating \checkmark equal roots \checkmark substitution \checkmark simplification ans ✓ (5) </p>
<p>6.6</p>	<p> $k < \frac{-21}{4}$ ✓ CA </p>	<p> ans ✓ (1) </p>
<p>[20]</p>		

5

1

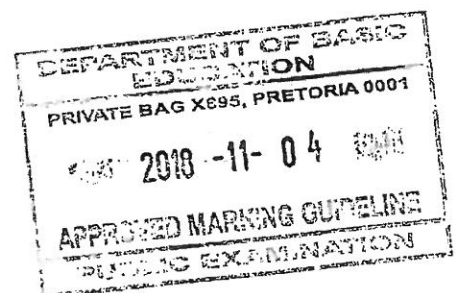


QUESTION/VRAAG 7

Don't forget rounding

<p>7.1.1</p> <p>16</p>	$F = \frac{x[(1+i)^n - 1]}{i}$ <p><i>both in ✓</i></p> $15\,000 \left[\left(1 + \frac{0,088}{4}\right)^{16} - 1 \right]$ <p><i>sub</i></p> $F = \frac{\quad}{0,088}$ $F = \frac{\quad}{4}$ <p><i>Afrikaans</i></p> <p><i>o.d. cr</i></p> <p><i>R283 972,28 ✓</i></p>	<p>✓ $\frac{0,088}{4}$ and $n = 16$</p> <p>✓ substitution into correct formula</p> <p>✓ answer</p> <p>(3)</p>
<p>7.1.2</p>	<p>$A = R283\,972,28 - 100\,000 \left(1 + \frac{0,088}{4}\right)^4$</p> <p>$= R\,174\,877,60$</p> <p><i>283 972,28 - 100 000</i></p> <p><i>o/3</i></p> <p>OR/OF</p> <p>Amount at end of 3 years:</p> $F = \frac{15\,000 \left[\left(1 + \frac{0,088}{4}\right)^{12} - 1 \right]}{0,088} - 100\,000$ $= R103\,459,12$ <p>Amount at end of 4 years:</p> $P(1+i)^n + \frac{x[(1+i)^n - 1]}{i}$ $= 103\,459,12 \left(1 + \frac{0,088}{4}\right)^4 + \frac{15\,000 \left[\left(1 + \frac{0,088}{4}\right)^4 - 1 \right]}{0,088}$ $= R\,174\,877,60$	<p>✓ future value – amount including interest (lost)</p> <p>✓ $100\,000 \left(1 + \frac{0,088}{4}\right)^4$</p> <p>✓ answer</p> <p>OR/OF</p> <p>✓ R15 000 including interest – R100 000</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DEPARTMENT OF BASIC EDUCATION</p> <p>PRIVATE BAG X695, PRETORIA 0001</p> <p>2018 -11- 04</p> <p>APPROVED MARKING GUIDELINE</p> <p>PUBLIC EXAMINATION</p> </div> <p>✓ $\left(1 + \frac{0,088}{4}\right)^4$ on P and x in F_v</p> <p>✓ method</p> <p>(3)</p>
<p>7.2.1</p>	$P = \frac{x[1 - (1+i)^{-n}]}{i}$ $1\,500\,000 = \frac{x \left[1 - \left(1 + \frac{0,105}{12}\right)^{-12 \times 20} \right]}{0,105}$ 12 <p>$x = R14\,975,70$</p>	<p>✓ $i = \frac{0,105}{12}$</p> <p>✓ $n = 240$</p> <p>✓ substitution into correct formula</p> <p>✓ answer</p> <p>(4)</p>

<p>7.2.2</p>	$P = \frac{x[1 - (1+i)^{-n}]}{i}$ $P = \frac{14\,975,70 \left[1 - \left(1 + \frac{0,105}{12} \right)^{-12 \times 8} \right]}{\frac{0,105}{12}}$ <p><i>n = 104 in Pv max 2/5</i></p> <p>$P = R969\,927,74$</p> <p>OR/OF</p> <p>Balance outstanding = A – F</p> $= 1\,500\,000 \left(1 + \frac{0,105}{12} \right)^{144} - \frac{14\,975,70 \left[\left(1 + \frac{0,105}{12} \right)^{144} - 1 \right]}{\frac{0,105}{12}}$ <p>$= R5\,259\,229,61 - R4\,289\,302,47$</p> <p>$= R969\,927,14$</p>	<p>7.2.1</p> <ul style="list-style-type: none"> ✓ R14 975,70 in P_v-formula ✓✓ n = 96 ✓ substitution into correct formula ✓ answer <p>(5)</p> <p>OR/OF</p> <ul style="list-style-type: none"> ✓ n = 144 in A-formula ✓ n = 144 in F_v-formula ✓ R14 975,70 in F_v ✓ A – F <p>✓ answer</p> <p>(5)</p>
[15]		



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QUESTION/VRAAG 8

<p>8.1</p>	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - 5 - x^2 + 5}{h}$ $= \lim_{h \rightarrow 0} \frac{h(2x+h)}{h}$ $= \lim_{h \rightarrow 0} (2x+h)$ $= 2x$ <p>OR/OF</p> $f(x+h) = (x+h)^2 - 5$ $= x^2 + 2xh + h^2 - 5$ $f(x+h) - f(x) = x^2 + 2xh + h^2 - 5 - (x^2 - 5)$ $= 2xh + h^2$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{2xh + h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(2x+h)}{h}$ $= \lim_{h \rightarrow 0} (2x+h)$ $= 2x$	<p>✓ $x^2 + 2xh + h^2 - 5$ ✓ simplification ✓ factorisation ✓ $\lim_{h \rightarrow 0} (2x+h)$ ✓ $2x$</p> <p>(5)</p> <p>OR/OF</p> <p>✓ $x^2 + 2xh + h^2 - 5$ ✓ simplification ✓ factorisation ✓ $\lim_{h \rightarrow 0} (2x+h)$ ✓ $2x$</p> <p>(5)</p>
<p>8.2.1</p>	$y = 3x^3 + 6x^2 + x - 4$ $\frac{dy}{dx} = 9x^2 + 12x + 1$	<p>✓ $9x^2$ ✓ $12x$ ✓ 1</p> <p>(3)</p>
<p>8.2.2</p>	$y(x-1) = 2x(x-1)$ $y = \frac{2x(x-1)}{x-1} \text{ if } x \neq 1$ $y = 2x$ $\frac{dy}{dx} = 2$	<p>✓ $y(x-1)$ ✓ $2x(x-1)$ ✓ $y = 2x$ ✓ answer</p> <p>(4)</p>
<p>[12]</p>		

Not for f
 not for f
 only in 8.1

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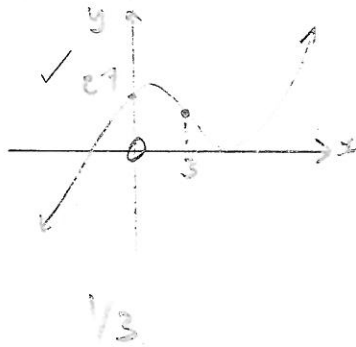
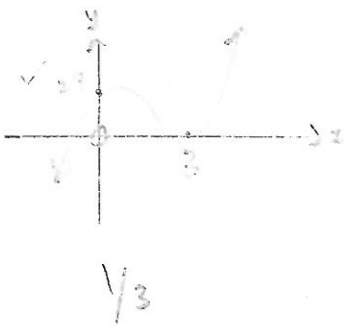
QUESTION/VRAAG 9

g(x) = (x+5) only 1 line

<p>9.1.1</p>	<p>$g(x) = (x+5)(x-x_1)^2$ <i>cubic context GE 1/4 mark</i> $20 = 5(x_1)^2$ $x_1^2 = 4$ $x_1 = 2$ ✓ $g(x) = (x+5)(x-2)^2$ $g(x) = (x+5)(x^2 - 4x + 4)$ ✓ $g(x) = x^3 + x^2 - 16x + 20$</p> <p><i>d = 20 ok</i> <i>int cont use 0/4</i> <i>b = 1 c = -16</i></p>	<p>✓ $(x+5)$</p> <p>✓ repeated root ✓ $x_1 = 2$</p> <p>✓ $g(x) = (x+5)(x^2 - 4x + 4)$</p> <p>(4)</p>
<p>9.1.2</p>	<p>$g(x) = x^3 + x^2 - 16x + 20$ $g'(x) = 3x^2 + 2x - 16$ ✓ $3x^2 + 2x - 16 = 0$ ✓ = 0 $(3x+8)(x-2) = 0$ ✓ fact $x = -\frac{8}{3}$ or $x = 2$ ✓ $R\left(-\frac{8}{3}; \frac{1372}{27}\right)$ or $R(-2,67; 50,81)$ ✓ $P(2; 0)$</p> <p><i>Can't leave out labels P & R</i></p>	<p>✓ derivative</p> <p>✓ equating to zero ✓ factors</p> <p>✓ co-ordinates of R ✓ co-ordinates of P</p> <p>(5)</p>
<p>9.1.3</p>	<p>$g''(x) = 6x + 2$ ✓ $g''(0) = 2$ ✓ \therefore concave up ✓</p> <p>OR/OF</p> <p>$g''(x) = 6x + 2$ $6x + 2 = 0$ $x = -\frac{1}{3}$ is the point of inflection \therefore concave up <i>(to the right of poi)</i></p> <p><i>d.o 1/3</i></p>	<p>✓ $g''(x) = 6x + 2$ ✓ $g''(0) = 2$ ✓ conclusion</p> <p>(3)</p> <p>OR/OF</p> <p>✓ $g''(x) = 6x + 2$ ✓ $x = -\frac{1}{3}$ ✓ conclusion</p> <p>(3)</p>

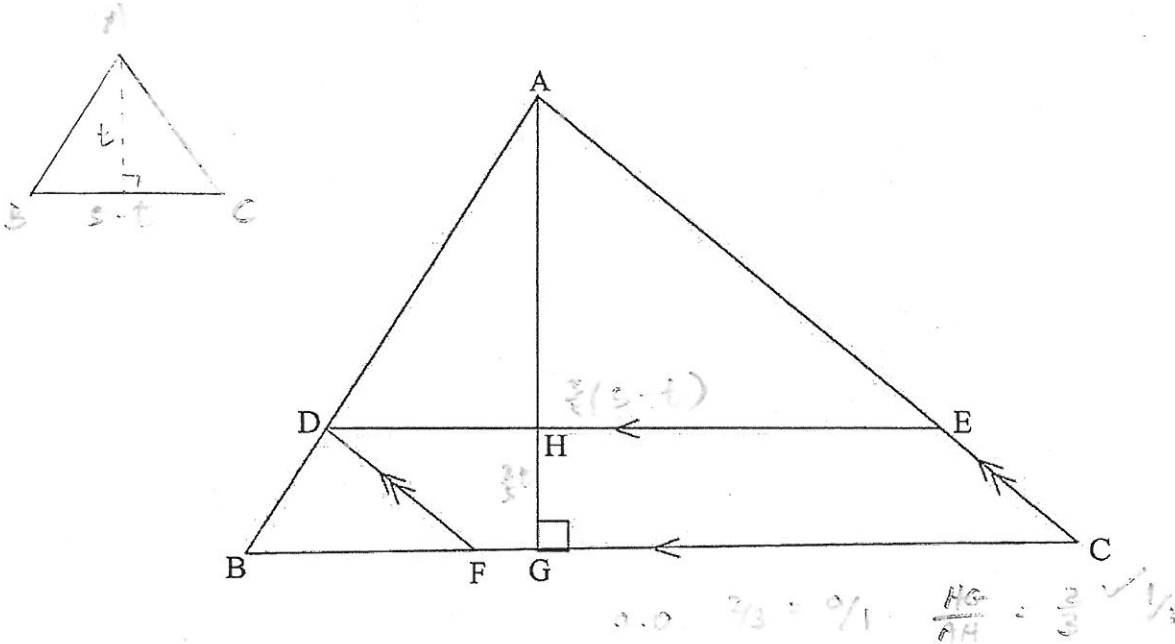


<p>9.2</p>		<ul style="list-style-type: none"> ✓ <u>y</u> – intercept of a cubic graph ✓ point of inflection and stationary point, $x = 3$ ✓ <i>only 13 then 2 mark</i> concave up for $x < 3$ and concave down for $x > 3$ <p style="text-align: right;">(3) [15]</p>
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QUESTION/VRAAG 10



10.1	$\frac{AH}{HG} = \frac{3}{2}$ ✓ 3:2 ... = $\frac{AE}{EC} = \frac{AD}{DB}$ OK	✓ answer (1)
10.2	Area of a parallelogram = base × ⊥ height $Area = \frac{3}{5}(5-t) \cdot \frac{2}{5}t$ $Area = \frac{6}{25}(5-t)t$ $A(t) = -\frac{6}{25}t^2 + \frac{6}{5}t$ ✓ → $x_{top} = \frac{-(-\frac{6}{25})}{2(-\frac{6}{25})}$ ✓ $A'(t) = -\frac{12}{25}t + \frac{6}{5}$ $-\frac{12}{25}t + \frac{6}{5} = 0$ $12t - 30 = 0$ $t = \frac{30}{12}$ or $\frac{5}{2}$ ✓	$\checkmark \frac{2}{5}t$ $\checkmark \frac{3}{5}(5-t)$ $\checkmark A(t) = -\frac{6}{25}t^2 + \frac{6}{5}t$ $\checkmark -\frac{12}{25}t + \frac{6}{5}$ ✓ answer (5)
		[6]

$A = (5-t)(t)$ ✓ intro/conclusion
 $5-t=0$ ✓
 $t = 5/2$ ✓
 $A = (5-t)(t)$
 $-5t + t^2$
 $A' = 5 - 2t$
 $0 = 5 - 2t$ ✓ $t = 5/2$ ✓

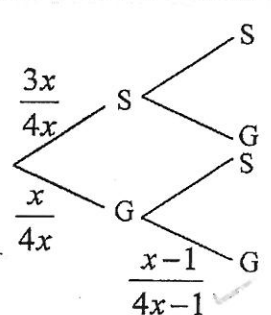
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QUESTION/VRAAG 11

11.1.1	$7^5 = 16\ 807$ <i>any form 2/2</i>	✓✓ answer (2)
11.1.2	$7 \times 6 \times 5 \times 4 \times 3$ $= \frac{7!}{2!} = 2520$ <i>any version</i>	✓ $7 \times 6 \times 5 \times 4 \times 3$ or $\frac{7!}{2!}$ ✓ answer (2)
11.2	$2 \times 7 \times 1 = 14$ <i>1 x 7 x 1 + 1 x 7 x 1</i> <i>2 + 2 = 1</i> <i>✓ x x 1/3</i>	✓✓✓ $2 \times 7 \times 1$ (3)
		[7]

QUESTION/VRAAG 12

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$ ✓ if skew $n = 0$

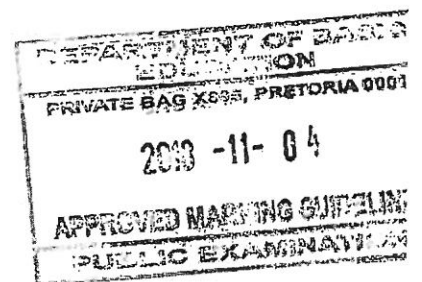
12.1	$P(A \text{ or } B) = P(A) + P(B)$ $0,74 = 0,45 + y$ $y = 0,29$ <i>o.o. 3/3</i>	✓ $P(A \text{ or } B) = P(A) + P(B)$ ✓ substitution ✓ answer (3)
12.2	<p><i>in context</i></p>  <p>Let the number of mystery gift bags = x The total number of bags = $4x$</p> <p>$\left(\frac{x}{4x}\right) \times \left(\frac{x-1}{4x-1}\right) = \frac{7}{118}$ $\frac{1}{4} \times \frac{x-1}{4x-1} = \frac{7}{118}$ $\frac{x-1}{4x-1} = \frac{28}{118}$ $118x - 118 = 112x - 28$ $x = 15$</p> <p><i>OR</i> $\frac{1}{4} \times \left(\frac{x-1}{x-1}\right) = \frac{7}{118}$ $x = 60$ <i>Mystery : 60 - 15</i></p>	<p>✓ $4x$</p> <p>✓ $\left(\frac{x}{4x}\right)$ or $\left(\frac{1}{4}\right)$</p> <p>✓ $\left(\frac{x-1}{4x-1}\right)$</p> <p>✓ $\frac{1}{4} \times \frac{x-1}{4x-1}$</p> <p>✓ equating to $\frac{7}{118}$</p> <p>✓ answer (6)</p>

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<p>OR/OF $P(\text{gift and gift}) = P(\text{gift at first draw}) \times P(\text{gift at second draw})$ $\frac{7}{118} = \frac{1}{4} \times P(\text{gift at second draw})$</p> <p>$P(\text{gift at second draw}) = \frac{7}{118} \div \frac{1}{4}$ $= \frac{14}{59}$</p> <p>Therefore: $P(\text{gift at first draw}) = \frac{15}{60}$</p> <p>And: 15 bags had mystery gifts inside</p>	<p>OR/OF</p> <p>✓ $\frac{1}{4}$</p> <p>✓ $\frac{1}{4} \times P(\text{gift at 2}^{\text{nd}} \text{ draw})$</p> <p>✓ $\frac{7}{118} = \frac{1}{4} \times P(\text{gift at 2}^{\text{nd}} \text{ draw})$</p> <p>✓ $\frac{14}{59}$</p> <p>✓ $\frac{15}{60}$</p> <p>✓ answer (6)</p> <p>[9]</p>
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TOTAL/TOTAAL: 150



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