



Province of the
EASTERN CAPE
EDUCATION

SUT / file

**NATIONAL
SENIOR CERTIFICATE
NASIONALE
SENIOR SERTIFIKAAT**

GRADE 12/GRAAD 12

SEPTEMBER 2020

**MATHEMATICS P1/WISKUNDE VI
MARKING GUIDELINE/NASIERIGLYN**

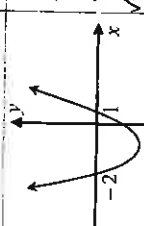
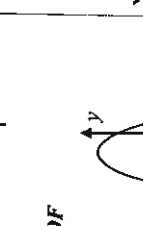
MARKS/PUNTE: 150 147 → 150

This marking guideline consists of 16 pages.
Hierdie nasieriglyf bestaan uit 16 bladsye.

NOTE/LET WEL:

- If a candidate answers a question TWICE, mark the FIRST attempt ONLY.
Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk SLEGS die EERSTE poging.
- Consistent accuracy applies in ALL aspects of the marking guideline.
Volgehoue akkuraatheid geld deurgaans in ALLE aspekte van die nasieriglyf.
- If a candidate crossed out an attempt of a question and did not redo the question, mark the crossed-out attempt.
Indien 'n kandidaat 'n poging vir 'n vraag deurgetrek het en nie die vraag weer beantwoord het nie, merk die poging wat deurgetrek is.
- The mark for substitution is awarded for substitution into the correct formula.
Die punt vir substitusie word vir substitusie in die korrekte formule toegeken.

QUESTION 1/VRAAG 1

1.1.1	$2x^2 + x - 3 = 0$ $(2x+3)(x-1) = 0$ ✓ $\therefore x = -\frac{3}{2}$ or / of $x = 1$ ✓ \rightarrow	✓ factorisation / faktorisering $\checkmark x = -\frac{3}{2}$ ✓ $x = 1$	(3)	
1.1.2	$x(7x+2) = 1$ $7x^2 + 2x - 1 = 0$ ✓ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-2 \pm \sqrt{2^2 - 4(7)(-1)}}{2(7)}$ ✓ $= \frac{-2 \pm \sqrt{32}}{14}$ $= 0,26$ or / of $-0,55$ ✓ \rightarrow	✓ standard form / standaardvorm ✓ substitution / vervanging	(4)	
1.1.3	$-x^2 - x + 2 \leq 0$ $x^2 + x - 2 \geq 0$ ✓ $(x+2)(x-1) \geq 0$ ✓ $\therefore x \leq -2$ or / of $x \geq 1$ ✓ \checkmark or 0	 OR/OF 	$\checkmark x^2 + x - 2 \geq 0$ $\checkmark x^2 + x - 2 \geq 0$ factors $\checkmark x \leq -2$ or $x \geq 1$ OR/OF $\checkmark 1 - x$ \checkmark factorisation / faktorisering $\checkmark x \leq -2$ ✓ $x \geq 1$	(4)

5

<p>1.1.3</p>	$-x^2 - x + 2 \leq 0$ $x-1: \quad x^2 + x - 2 \geq 0$ $(x+2)(x-1) \geq 0$ $\frac{(x+2)(x-1)}{x} \geq 0$	$x \leq -2 \text{ or } 1 \leq x$	
<p>1.1.4</p>	$2^x + 2^{2-x} = \frac{17}{2}$ $2 \cdot 2^x + 2 \cdot 2^{2-x} = 17$ $2 \cdot 2^x + \frac{2^3}{2^x} = 17$ $2 \cdot 2^{2x} - 17 \cdot 2^x + 8 = 0$ <p>Let / Laat $k = 2^x$</p> $\therefore 2k^2 - 17k + 8 = 0$ $(2k-1)(k-8) = 0$ $k = \frac{1}{2} \text{ or / of } k = 8$ $\therefore 2^x = 2^{-1} \text{ or / of } 2^x = 2^3$ $x = -1 \text{ or / of } x = 3$	<p>OR/OF</p> $x = -1 \text{ or / of } x = 3$	<p>OR/OF</p> $2^x + 2^{2-x} = \frac{17}{2}$ $2 \cdot 2^x + 2 \cdot 2^{2-x} = 17$ $2 \cdot 2^x + \frac{2^3}{2^x} = 17$ $2 \cdot 2^{2x} - 17 \cdot 2^x + 8 = 0$ $(2 \cdot 2^x - 1)(2^x - 8) = 0$ $\therefore 2^x = 2^{-1} \text{ or / of } 2^x = 2^3$ $x = -1 \text{ or / of } x = 3$

<p>✓ standard form / standaardvorm</p> <p>✓ substitution / vervanging $k = 2^x$</p> <p>✓ factorisation / faktorisering</p>	<p>✓ $2^x = 2^{-1}$ and/en $2^x = 2^3$</p> <p>✓ both answers / beide antwoorde</p>	<p>OR/OF</p> <p>OR/OF</p>
<p>✓ standard form / standaardvorm</p> <p>✓ factorisation / faktorisering</p> <p>✓ $2^x = 2^{-1}$ ✓ $2^x = 2^3$</p>	<p>✓ both answers / beide antwoorde</p>	<p>OR/OF</p> <p>OR/OF</p>

1.2

$(x-2)^2 + y^2 = 25$
 $x+3-3y=0$
 $(x-2)^2 + y^2 = 25$

(1) $(x-2)^2 + y^2 = 25$
 (2) $x+3-3y=0$
 (3) $x=3y-3$

$(3y-3-2)^2 + y^2 = 25$
 $(3y-5)^2 + y^2 = 25$
 $9y^2 - 30y + 25 + y^2 = 25$
 $10y^2 - 30y = 0$
 $10y(y-3) = 0$
 $\therefore y=0$ or/of $y=3$
 $x=3$ or/of $x=6$

$\therefore A(-3;0)$ and/en $B(6;3)$

$x=3y-3$
 substitution / vervanging
 standard form / standaardvorm
 factorisation / faktorisering
 x and y values / x en y waardes
 both sets of coordinates / beide stelle van koördinate
 OR/OF
 OR/OF

$10y^2 - 30y = 0$
 $\div 10: y^2 - 3y = 0$
 $y(y-3) = 0$
 $y = 0$ or $y = 3$

1.3

$(x-2)^2 + y^2 = 25$
 $x+3-3y=0$
 $y = \frac{1}{3}(x+3)$

$(x-2)^2 + \left(\frac{x+3}{3}\right)^2 = 25$
 $x^2 - 4x + 4 + \frac{x^2 + 2x + 9}{9} + 1 - 25 = 0$
 $9x^2 - 36x + 36 + x^2 + 2x + 9 + 9 - 225 = 0$
 $10x^2 - 30x - 180 = 0$
 $x^2 - 3x - 18 = 0$
 $(x+3)(x-6) = 0$
 $\therefore x = -3$ or/of $x = 6$
 $\therefore y = 0$ or/of $y = 3$
 $\therefore A(-3; 0)$ $B(6; 3)$

$(x+m)(x+n) = \frac{b}{a}x + \frac{c}{a}$
 $x^2 + nx + mx + mn - p^2 = 0$
 $x^2 + (m+n)x + (mn-p^2) = 0$
 For real roots / Vir reële wortels:
 $b^2 - 4ac \geq 0$
 $\therefore (m+n)^2 - 4(1)(mn-p^2) \geq 0$
 $m^2 + 2mn + n^2 - 4mn + 4p^2 \geq 0$
 $m^2 - 2mn + n^2 + 4p^2 \geq 0$
 $(m-n)^2 + (2p)^2 \geq 0$
 Now/Maar: $(m-n)^2 \geq 0$ and/en $(2p)^2 \geq 0$
 $\therefore \Delta \geq 0$

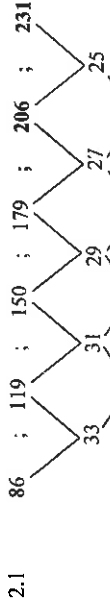
$x^2 + (m+n)x + (mn-p^2) = 0$
 $(m+n)^2 - 4(1)(mn-p^2) \geq 0$
 $(m-n)^2 + (2p)^2 \geq 0$
 explanation / verduideliking

substitution / vervanging
 standard form / standaardvorm
 factorisation / faktorisering
 x and y values / x en y waardes
 both sets of coordinates / beide stelle koördinate

$x^2 + (m+n)x + (mn-p^2) = 0$
 $(m+n)^2 - 4(1)(mn-p^2) \geq 0$
 $(m-n)^2 + (2p)^2 \geq 0$
 explanation / verduideliking

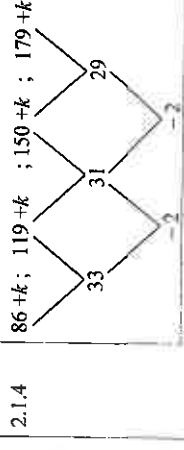
see handwritten correction P10

QUESTION 2 / VRAAG 2



2

2.1.1	$206 = 231 + a$ $2a = -2$ $\therefore a = -1$ $3a + b = 33$ $-3 + b = 33$ $\therefore b = 36$ $a + b + c = 86$ $-1 + 36 + c = 86$ $\therefore c = 51$ $T_n = -n^2 + 36n + 51$	$\checkmark a = -1$ $\checkmark b = 36$ $\checkmark c = 51$ $\checkmark T_n = -n^2 + 36n + 51$	(2)
2.1.2	$326 = -n^2 + 36n + 51$ $n^2 - 36n + 275 = 0$ $(n - 11)(n - 25) = 0$ $\therefore n = 11$ or / of $n = 25$	\checkmark \checkmark \checkmark \checkmark	(4)
2.1.3	$326 = -n^2 + 36n + 51$ $n^2 - 36n + 275 = 0$ $(n - 11)(n - 25) = 0$ $\therefore n = 11$ or / of $n = 25$	\checkmark substitution / vervanging \checkmark method / metode \checkmark answers / antwoorde	(3)



2

2.1.4	$86 + k = 119 + k$ $206 = -2$ $\therefore a = -1$ $3a + b = 33$ $-3 + b = 33$ $\therefore b = 36$ $a + b + c = 86 + k$ $-1 + 36 + c = 86 + k$ $\therefore c = 51 + k$ $\therefore T_n + k = -n^2 + 36n + (51 + k)$	$\checkmark a = -1$ and / en $b = 36$ $\checkmark c = 51 + k$	(2)
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$P_n = -n^2 + 36n + 51 + k$

1.3. $(x+m)(x+h) = 3p^2$

$x^2 + hx + mx + nh - 3p^2 = 0$

$x^2 + x(m+h) + mn - 3p^2 = 0$

$\Delta = (m+h)^2 - 4(1)(mn - 3p^2)$

$= m^2 + 2hm + h^2 - 4mn + 12p^2$

$= m^2 - 2hm + m^2 + 12p^2$

$= (m-h)^2 + 12p^2$

Now, if $n, m, p \in \mathbb{R}$

then $(m-h)^2 \geq 0$ and $p^2 \geq 0$

$\therefore 12p^2 \geq 0$

$\Delta \geq 0$

\therefore roots are real

4

<p>2.2.1</p> $2y - 1; 4y - 1; 6y - 1$ $d = 4y - 1 - (2y - 1)$ $= 2y$ $T_n = 2yn - 1$ $T_{30} = 2y(30) - 1$ $= 60y - 1$ <p>OR/OF</p> $T_n = a + (n-1)d$ $T_{30} = (2y - 1) + (30 - 1)(2y)$ $= 2y - 1 + 58y$ $= 60y - 1$ <p>ad 3/3 inspection</p>	<p>✓ $d = 2y$</p> <p>✓ $2yn - 1$</p> <p>✓ $60y - 1$</p> <p>OR/OF</p> <p>✓ $d = 2y$</p> <p>✓ substitution / vervanging</p> <p>✓ answer / antwoord</p>	<p>3</p>
<p>2.2.2</p> $S_n = \frac{n}{2}[2a + (n-1)d]$ $S_{30} = \frac{30}{2}[2(2y - 1) + 29(2y)]$ $= 15(4y - 2 + 58y)$ $= 15(62y - 2)$ $\therefore -2820 = 15(62y - 2)$ $-188 = 62y - 2$ $-186 = 62y$ $\therefore y = -3$ <p>OR/OF</p> $S_n = \frac{n}{2}[a + l]$ $S_{30} = \frac{30}{2}[2y - 1 + 60y - 1]$ $-2820 = 15[62y - 2]$ $-188 = 62y - 2$ $-186 = 62y$ $\therefore y = -3$	<p>✓ $d = 2y$</p> <p>✓ substitution into correct formula</p> <p>✓ <i>vervanging in die korrekte formule</i></p> <p>✓ equating to -2820</p> <p>✓ <i>stel gelyk aan -2820</i></p> <p>✓ answer / antwoord</p> <p>OR/OF</p> <p>✓ $a = 2y$ and $l = 60y - 1$</p> <p>✓ substituting a and l</p> <p>✓ <i>vervanging van a en l</i></p> <p>✓ equating to -2820</p> <p>✓ <i>stel gelyk aan -2820</i></p> <p>✓ answer / antwoord</p>	<p>4</p>

QUESTION 3/VR.4.4G 3

<p>3.1</p> $1 + 4 + 4^2 + 4^3 + \dots + 4^{n-1}$ $\therefore T_n = 4^{n-1}$ $\therefore \text{Sum/Som: } \sum_{n=1}^{5000} 4^{n-1}$ <p>For original sequence: /Vir oorspronklike ry:</p> $\text{Sum/Som: } \sum_{n=1}^{5000} 4^{n-1}$ $S_n: \sum_{n=1}^{5000} 4^{n-1}$	<p>✓ $T_n = 4^{n-1}$</p> <p>✓ $\sum_{n=1}^{5000} 4^{n-1}$</p> <p>✓ $\sum_{n=1}^{5000} 4^{n-1}$</p> <p>✓ answer / antwoord</p>	<p>4</p>
<p>3.2</p> $S_n = \frac{1}{a-r}$ $1 + x + x^2 + x^3 + \dots = \frac{1}{1-x}$ $1 - x + x^2 - x^3 + \dots = \frac{1}{1+x}$ <p>Sum/Som:</p> $\frac{1}{1-x} + \frac{1}{1+x}$ $= \frac{1+x+1-x}{(1-x)(1+x)}$ $= \frac{2}{1-x^2}$ $\therefore \frac{2}{1-x^2} = 8$ $8 - 8x^2 = 2$ $-8x^2 = -6$ $x^2 = \frac{3}{4}$ $x = \pm \frac{\sqrt{3}}{2}$	<p>✓ $\frac{1}{1-x}$</p> <p>✓ $\frac{1}{1+x}$</p> <p>✓ $\frac{2}{1-x^2}$</p> <p>✓ equating sum to 8</p> <p>✓ <i>stel som gelyk aan 8</i></p> <p>✓ $x^2 = \frac{3}{4}$</p> <p>✓ answer / antwoord</p>	<p>6</p>

QUESTION 4/VRAAG 4

4.1	$f(x) = \frac{a}{x-1} + 3$ $\checkmark x=1$; $\checkmark y=3$	$\checkmark x=1$ $\checkmark y=3$	(2)
4.2	$y = \frac{a}{0-1} + 3$ $= 3-a$ $\checkmark 0 = \frac{a}{x-1} + 3$ $-3 = \frac{a}{x-1}$ $-3(x+3) = a$ $\checkmark x = 1 - \frac{a}{3}$ or / of $\frac{3-a}{3}$	$\checkmark 3-a$ $\checkmark y=0$ $\checkmark x = 1 - \frac{a}{3}$ or / of $\frac{3-a}{3}$	(3)
4.3		\checkmark asymptotes / asymptote \checkmark y-intercept / y-afsnitte \checkmark x-intercept / x-afsnitte \checkmark shape / vorm	(4)
4.4	$f(x) = \frac{a}{x+2} + 1$ or / of $f(x) = \frac{-1}{x+2} + 1$	$\checkmark x+2$ $\checkmark y+1$	(2)

fold va $x=1$ ha $y=3$
 fnew $z \leftarrow$ $z \downarrow$
 va $x=1-3$ ha $y=3-3$
 $x=-2$ $y=0$

1 + 2 + 3 + 4 + 5 + 6 + ... + 5000

4^0 1 4 16 64 256 1024 4096
 4^1 4 16 64 256 1024 4096
 4^2 16 64 256 1024 4096
 4^3 64 256 1024 4096
 4^4 256 1024 4096
 4^5 1024 4096
 4^6 4096
 $\sum_{k=1}^{5000} k$ $\checkmark \sum_{k=0}^6 \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark$

3.2.

$1 + x + x^2 + x^3 + x^4 + \dots$
 $1 - x + x^2 - x^3 + x^4 + \dots$
 $\checkmark \checkmark 2 + 2x^2 + 2x^4 + \dots$

$S_0 = \frac{a}{1-r} = \frac{2}{1-x^2} \checkmark$ RMS
 $8(1-x^2) = 2 \quad \cdot \quad -1 < x < 1$
 $1-x^2 = \frac{1}{4} \quad \cdot \quad -1 < -x < 1$
 $\pm \sqrt{\frac{3}{4}} = x \quad \cdot \quad | > x > -1$
 $\pm 0,87 = x \checkmark$

4 6

QUESTION 5/VRAAG 5

5.1	$D(0; -7)$ ✓ $q = -8$ ✓ $g(x) = b^x - 8$ $-5 = b^1 - 8$ ✓ sub (1; -5) $\therefore b = 3$	(1)
5.2		(1)
5.3	<p>At turning point of f: / By die draaipunt van f:</p> $\checkmark \frac{y}{x} = \frac{b}{2a} = \frac{3}{4}$ ✓ $\Rightarrow \frac{3}{2a} = \frac{3}{4}$ ✓ sub b = 3 $\therefore -6a = -12$ ✓ <small>↳ thru</small> $a = 2$ ✓ <small>↳ thru</small> $\therefore -5 = 2(1)^2 + 3(1) + c$ ✓ sub (1; -5) $c = -10$ ✓	(6)
5.4	$y > -8$ ✓ $y + 9x = -28$ ✓ $y = -9x - 28$ ✓ $y = 2x^2 + 3x - 10$ ✓ $\therefore 2x^2 + 3x - 10 = -9x - 28$ ✓ $2x^2 + 12x + 18 = 0$ ✓ $x^2 + 6x + 9 = 0$ ✓ $(x+3)(x+3) = 0$ ✓ $\therefore x = -3$ ✓ $y = 2(-3)^2 + 3(-3) - 10$ $= -1$ ✓ $\therefore T(-3; -1)$ ✓	(2)
5.5	$y = -9x - 28$ ✓ $\therefore m = -9$ ✓ $f(x) = 2x^2 + 3x - 10$ ✓ $f'(x) = 4x + 3$ ✓ $\therefore 4x = -12$ ✓ $x = -3$ ✓ $y = -9(-3) - 28$ $= -1$ ✓ $\therefore T(-3; -1)$ ✓	(5)

5.2 $y = ax^2 + bx + c$

$y = b^x + q$

$y = 4^x - 8$

sub (1; -5)

$-5 = b^1 - 8$ ✓

$3 = b$

$y = ax^2 + 3x + c$ ip $(-\frac{3}{2a}, y)$

$y' = 2ax + 3$ ✓

sub $(-\frac{3}{2a}, y)$

$0 = 2a(-\frac{3}{2a}) + 3 + c$ start pt $y' = 0$

$-3 + \frac{3}{2a} + 3 + c = 0$

$0 = \frac{-3}{2a}$

$= 2$

$y = 2x^2 + 3x + c$ o = 2 b = 3

sub (1; -5)

$-5 = 2(1)^2 + 3(1) + c$ ✓

$-5 = 2 + 3 + c$

$-10 = c$

OR/OF

OR/OF

$m = -9$ ✓

$f'(x) = 4x + 3$ ✓

equating gradients / stel gradiente gelyk

$x = -3$ ✓

$y = -1$ ✓

5

5.6 $y = \log_3 x$

$\checkmark y = \log_3 x$
 $x = 3^y$

5.7 $p(x) = f(x) + 1$

$= 2x^2 + 3x - 10 + 1$
 $= 2x^2 + 3x - 9$
 $= (2x - 3)(x + 3)$

\therefore when/wanneer: $y = 0$,

$x = \frac{3}{2}$ or / of -3

$\therefore x < -3$ or / of $0 < x < \frac{3}{2}$

$\checkmark p(x) = 2x^2 + 3x - 9$

\checkmark x-intercepts / x-afsnitte

$\checkmark x < -3$

$\checkmark 0 < x < \frac{3}{2}$ (accuracy/akktuuraetheit)

(4)

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5.6 $g(x) = \dots$

$y = 6^x + 9$
 $y = 3^x - 8$

$h(x) = \dots$

$9 \uparrow 8$
 $y = 3^x$

$h^{-1} = \dots$

$x = 3^y$ ✓
 $y = \log_3 x$ ✓

5.7 $f(x) = \dots$

$y = 2x^2 + 3x - 10$

$p(x) = \dots$

$f \uparrow$
 $y = 2x^2 + 3x - 9$ ✓

$x \cdot p(x) < 0$

$x(2x^2 + 3x - 9) < 0$

$x(2x - 3)(x + 3) < 0$ ✓ Factors of p

4

$\frac{x(2x-3)(x+3)}{x}$

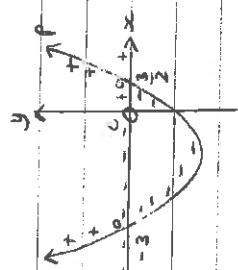
$x < -3$ or $0 < x < \frac{3}{2}$

(OR)

$x \cdot p(x) < 0$

$x \cdot y \cdot p < 0$

$x \in (-\infty; -3) \text{ or } (0; \frac{3}{2})$



QUESTION 6/VRAG 6

<p>6.1</p> $A = P(1-i)^n$ $\frac{1}{3}x = x(1-i)^4$ $\frac{1}{3} = (1-i)^4$ $\sqrt[4]{\frac{1}{3}} = 1-i$ $i = 0,24$ <p>$\therefore r = 24\%$ <u>24,02</u> \checkmark</p>	<p>(3)</p> <p>$\checkmark \frac{1}{3}x = x(1-i)^4$</p> <p>$\checkmark$ answer / antwoord</p> <p>$\checkmark i = 0,24$</p>
<p>6.2.1</p> $F = \frac{x[(1+i)^n - 1]}{i}$ $R596458,10 = \frac{x \left[\left(1 + \frac{0,095}{12}\right)^{72} - 1 \right]}{0,095}$ $x = \frac{R596458,10 \times \frac{0,095}{12}}{\left[\left(1 + \frac{0,095}{12}\right)^{72} - 1 \right]}$ $= R6178,13$	<p>(5)</p> <p>$\checkmark i = \frac{0,095}{12}$</p> <p>$\checkmark n = 72$</p> <p>$\checkmark F = R596458,10$</p> <p>$\checkmark$ substitution into correct formula / <i>vervang in die korrekte formule</i></p> <p>\checkmark answer / antwoord</p>
<p>6.2.2</p> $P = \frac{x \left[1 - \left(1 + \frac{0,095}{12}\right)^{-72} \right]}{\frac{0,095}{12}}$ $= R338070,29$ $A = P(1+i)^n$ $R338070,29 = P \left(1 + \frac{0,095}{12}\right)^5$ $\therefore P = \frac{R338070,29}{\left(1 + \frac{0,095}{12}\right)^5}$ $= R325000$	<p>(6)</p> <p>$\checkmark n = -72$</p> <p>\checkmark substitution into correct formula / <i>vervang in die korrekte formule</i></p> <p>$\checkmark A = R338070,29$</p> <p>$\checkmark n = 5$</p> <p>$\checkmark$ substitution into correct formula / <i>vervang in die korrekte formule</i></p> <p>\checkmark answer / antwoord</p>

3 Δ

6.1.

$$A = P(1-i)^n$$

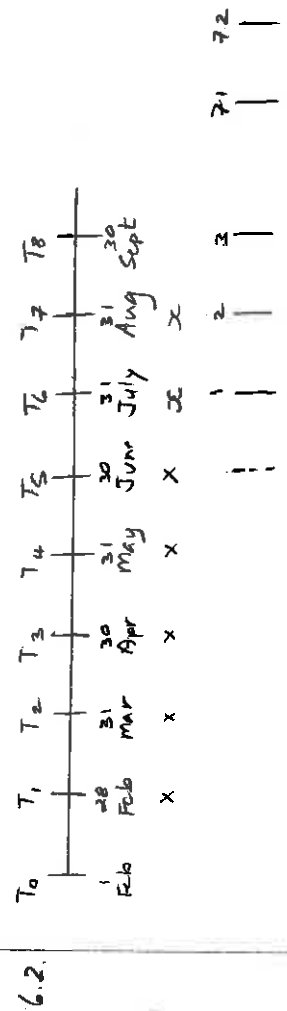
$$\frac{1}{3}x = x \left(1 - \frac{r}{100}\right)^4$$

$$\frac{1}{3} = \left(1 - \frac{r}{100}\right)^4$$

$$\sqrt[4]{\frac{1}{3}} = 1 - \frac{r}{100}$$

$$r = 24,02\%$$

$\pm 4\sqrt{\quad}$ reject -



6.2.1.

T₅ - end

Monthly instalment

$$= \frac{596458,10}{72}$$

$$= R8284,14$$

6.2.2.

T₅ - end

$$P = \frac{x(1-i)^{-n}}{\frac{0,095}{12}}$$

$$= \frac{8284,14(1 - (1 + \frac{0,095}{12})^{-72})}{\frac{0,095}{12}}$$

$$= 453312,18$$

T₅ - end

$$A = P(1+i)^n$$

$$453312,18 \dots = P \left(1 + \frac{0,095}{12}\right)^5$$

$$P = R435787$$

check personalise rounding

QUESTION 7/VRAG 7 • PENALISE N ONCE ONLY ✓ N

<p>7.1</p> $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2(x+h)^2 - (-2x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{-2(x^2 + 2xh + h^2) + 2x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{-2x^2 - 4xh - 2h^2 + 2x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$ $= \lim_{h \rightarrow 0} (-4x - 2h)$ $= -4x$	<p>✓ substitution / vervanging</p> <p>✓ expansion / uitbreiding</p> <p>✓ $-2x^2 - 4xh - 2h^2 + 2x^2$</p> <p>✓ factorisation / faktoriseren</p> <p>OR/OF</p> <p>✓ $-4x$</p>
<p>$f(x) = -2x^2$</p> <p>$f(x+h) - f(x) = -2(x+h)^2 - (-2x^2)$</p> <p>$= -2x^2 - 2xh - 2h^2 + 2x^2$</p> <p>$= -4xh - 2h^2$</p> <p>$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$</p> <p>$= \lim_{h \rightarrow 0} \frac{-4xh - 2h^2}{h}$ ✓ sub</p> <p>$= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$ ✓ com fact</p> <p>$= \lim_{h \rightarrow 0} (-4x - 2h)$</p> <p>$= -4x$ ✓ a.o. 9/5</p>	<p>OR/OF</p> <p>✓ substitution / vervanging</p> <p>✓ factorisation / faktoriseren</p> <p>✓ $-4x$</p>
<p>7.2</p> <p>$y = 7x^4 - \frac{2}{\sqrt{x^3}}$</p> <p>$= 7x^4 - 2x^{-\frac{1}{2}}$</p> <p>$\therefore \frac{dy}{dx} = 28x^3 + 3x^{-\frac{3}{2}}$ ✓ only OA of exponent is $-\frac{1}{2}$</p> <p>$D_1 \left[\frac{1}{2}gt^2 - \frac{5}{t} + 3g \right]$</p> <p>$= D_1 \left[\frac{1}{2}gt^2 - 5t^{-1} + 3g \right]$</p> <p>$= gt + 5t^{-2} + 3g$</p>	<p>✓ $2x^{\frac{3}{2}}$</p> <p>✓ $28x^3 + 3x^{-\frac{3}{2}}$</p> <p>✓ $5t^{-1}$</p> <p>✓ $gt + 5t^{-2}$</p> <p>✓ $D_1(3g) = 0$</p>
<p>7.3</p>	<p>(4)</p> <p>(12)</p>

7.1. $f(x) = -2x^2$

$f(x+h) = -2(x+h)^2$

$= -2(x^2 + 2xh + h^2)$

$= -2x^2 - 4xh - 2h^2$

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

$= \lim_{h \rightarrow 0} \frac{-2x^2 - 4xh - 2h^2 - (-2x^2)}{h}$ ✓ sub

$= \lim_{h \rightarrow 0} \frac{-2x^2 - 4xh - 2h^2 + 2x^2}{h}$

$= \lim_{h \rightarrow 0} \frac{-4xh - 2h^2}{h}$

$= \lim_{h \rightarrow 0} \frac{h(-4x - 2h)}{h}$

$= \lim_{h \rightarrow 0} (-4x - 2h)$

$= -4x$ ✓

5

3

4

QUESTION 8/VRAAG 8

<p>8.1 $c(0;9) \rightarrow \checkmark$</p>	<p>$f(x) = 2x^3 + x^2 - 12x + 9$ $f(0) = 2(0)^3 + (0)^2 - 12(0) + 9 = 9$ $\therefore f(x) = (x-1)(2x^2 + 3x - 9)$ $\therefore 0 = (x-1)(x+3)(2x-3)$ $\therefore x = 1$ or / of $x = -3$ or / of $x = \frac{3}{2}$</p>
<p>8.2 \checkmark</p>	<p>method / metode $\checkmark 2x^2 + 3x - 9$ \checkmark factorisation / faktorisering $\checkmark D(-3;0) \checkmark E(1;0) \checkmark F(\frac{3}{2};0)$</p>
<p>8.3</p>	<p>For concave down / Vir konkaf afwaarts $f''(x) < 0$ $f'(x) = 6x^2 + 2x - 12$ $f''(x) = 12x + 2 < 0$ $x < -\frac{1}{6}$</p>
<p>8.4</p>	<p>$6x^2 + 2x - 12 \leq 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-2 \pm \sqrt{2^2 - 4(6)(-12)}}{2 \cdot 6}$ $= \frac{-2 \pm \sqrt{292}}{12}$ $= -1,59$ or / of $1,26$ $\therefore -1,59 \leq x \leq 1,26$</p>

$\checkmark 12x + 2 = 0$
 $x = -\frac{1}{6}$
 $x \in (-\infty; -\frac{1}{6})$

fill in 5
 6,4

8.2. $f(x) = 2x^3 + x^2 - 12x + 9$ Guess $x = \pm 1; \pm 2; \pm 3$

$f(1) = 2(1)^3 + (1)^2 - 12(1) + 9 = 0$
 $\therefore x-1$ is a factor
 $f(-3) = 2(-3)^3 + (-3)^2 - 12(-3) + 9 = 0$
 $\therefore x+3$ is a factor

$2x^3 + x^2 - 12x + 9$
 $= (x-1)(2x^2 + 3x - 9)$
 $= (x-1)(2x-3)(x+3)$

$f(x) = (x-1)(2x-3)(x+3)$
 $0 = (x-1)(2x-3)(x+3)$
 $\therefore x = 1; \frac{3}{2}$ or -3

$f(x) = (x+3)(2x-3)(x-1)$
 $0 = (x+3)(2x-3)(x-1)$
 $\therefore x = -3; \frac{3}{2}$ or 1

$\checkmark D(-3;0)$
 $\checkmark E(1;0)$
 $\checkmark F(\frac{3}{2};0)$

ii. HB HG B₁ B₂ B₃ G₁ G₂
 1 || 3 2

7 6 5 4 3 2 1

∴ 7! = 5040 → 2

Sample space

5 4 3 2 1 H H H H H
 4 2 2 1 2 1

∴ n(S) = 2! × 5!
 = 240

3 2 1 H G H B
 2 2 1 1 3

∴ n = 2! × 2 × 3 × 3!
 = 72

∴ Probability = $\frac{72}{240}$ ✓✓
 = $\frac{3}{10}$ ✓✓

4 Δ



EXAMINATIONS AND ASSESSMENT
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ERRATA

TO: PRINCIPALS OF SCHOOLS IN THE FET BAND
 DISTRICTS HEADS OF EXAMINATIONS
 FROM: MS N. MBELEKI
 CES: ASSESSMENT INSTRUMENTS DEVELOPMENT AND QUESTION
 PAPERS BANK MANAGEMENT
 DATE: 22 SEPTEMBER 2020

The Mathematics P1 Grade 12 for the Preparatory September Examination 2020 was written on Friday, 18 September 2020. We were made aware of certain errors that were discovered during the writing and marking process.

The following amended guidelines with regard to marking was prepared in conjunction with the examiner and moderator. In order to address this and to ensure that learners are not disadvantaged, the following standardised approach to marking must be adopted across the Province.

ERRATA

QUESTION 5/FR44G5

$g(x) = b^x - 8$ $-5 = b^x - 8$ $\therefore b = 3$ $f(x) = ax^2 + 3x + c$ $f'(x) = 2ax + 3$ $2ax + 3 = 0$ (at turning point) $2a\left(\frac{3}{4}\right) + 3 = 0$ $\frac{3}{2}a = -3$ $a = 2$ $\therefore -5 = 2(0)^2 + 3(0) + c$ $c = -10$	<ul style="list-style-type: none"> ✓ substituting (1; -5) / vervangingspaar (1; -5) ✓ $b = 3$ ✓ $2ax + 3 = 0$ ✓ $2a\left(\frac{3}{4}\right) + 3 = 0$ ✓ simplifying / vereenvoudiging ✓ $f'(0) = -5$
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ALTERNATIVE SOLUTION 5

(6)

5.6

$y = 3^x$ or: of $y = b^x$ $y = \log_b x$ or $y = \log_b x$	<ul style="list-style-type: none"> ✓ finding $h(x)$ / bepaling van $h(x)$ ✓ answer / antwoord
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(2)

QUESTION 6/FR44G6

$A = P(1 - i)^n$ $\frac{1}{3}x = x(1 - i)^4$ $\frac{1}{3} = (1 - i)^4$ $\sqrt[4]{\frac{1}{3}} - 1 = -i$ $-0,2401643143 = -i$ $\therefore i = 0,2401643143$ $\therefore i = 24,02\% \text{ p.a.}$	<ul style="list-style-type: none"> ✓ $\frac{1}{3}x = x(1 - i)^4$ ✓ $i = 0,2401643143$ ✓ answer / antwoord
--	--

(3)

ACCEPT/AANVAAR

6.2.1	$\text{Monthly deposit} = \frac{R596458,10}{7}$ $= R8284,14$	<ul style="list-style-type: none"> ✓ dividing by 7 / deel deur 7 ✓ answer / antwoord
6.2.2	$P = \frac{8284,14 \left[1 - \left(\frac{9,5\%}{12} \right)^{-72} \right]}{\frac{9,5\%}{12}}$ $= R453312,18$ $A = P(1 + i)^n$ $453312,18 = P \left(1 + \frac{9,5\%}{12} \right)^5$ $P = R435786,98$	<ul style="list-style-type: none"> ✓ $n = 72$ ✓ substitution into correct formula / vervangingspaar in die korrekte formule ✓ answer <p style="text-align: center;">XXXXXXXXXX</p> <ul style="list-style-type: none"> ✓ $n = 5$ ✓ substitution into correct formula / vervangingspaar in die korrekte formule ✓ answer / antwoord

6.2.1 allocate 3 mark:

6.2.2 mark to original mark allocation of 6 marks.

Total of the paper reduced to 147 (convert to 150).

NB - Learners that answered according the original memo - mark out of 150

QUESTION 7/FR44G7

IN THIS QUESTION WE PENALISE ONCE FOR INCORRECT NOTATION

QUESTION 8 / FRAG 8

<p>8.3</p> <p>For concave down: <i>Pr-konkaf afwaars</i></p> $f''(x) < 0$ $f'(x) = 6x^2 + 2x - 12$ $f''(x) = 12x + 2$ $\therefore 12x + 2 < 0$ $x < -\frac{1}{6}$ <p>(4)</p>	<p>$f''(x) < 0$</p> <p>$f'(x) = 6x^2 + 2x - 12$</p> <p>$f''(x) = 12x + 2$</p> <p>$\therefore x < -\frac{1}{6}$</p> <p>(4)</p>
<p>IF LEARNER WORKS WITH EQUALITY SIGNS AND CONCLUDES CORRECTLY. (4/4)</p> <p>IF LEARNER WORKS WITH EQUALITY SIGNS BUT DOES NOT CONCLUDE CORRECTLY. (3/4)</p> <p>Point of inflection (x-coordinate)</p> $f(x) = 2x^3 + x^2 - 12x + 9$ $x = \frac{-b}{3a}$ $= \frac{1}{3(2)}$ $= -\frac{1}{6}$ $\therefore x < -\frac{1}{6}$	<p>$f''(x) < 0$</p> <p>$f'(x) = 6x^2 + 2x - 12$</p> <p>$f''(x) = 12x + 2$</p> <p>$\therefore x < -\frac{1}{6}$</p> <p>(4)</p>
<p>8.4</p> $6x^2 + 2x - 12 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-2 \pm \sqrt{2^2 - 4(6)(-12)}}{2 \cdot 6}$ $= \frac{-2 \pm \sqrt{292}}{12}$ $= -1,59 \text{ or } 1,26$ $\therefore -1,59 \leq x \leq 1,26$	<p>$f''(x) < 0$</p> <p>$f'(x) = 6x^2 + 2x - 12$</p> <p>$f''(x) = 12x + 2$</p> <p>$\therefore x < -\frac{1}{6}$</p> <p>(4)</p>

QUESTION 10 / FRAG 10

<p>10.1</p> <p>Correct entries of: Korrekke waardes van:</p> <p>$\checkmark 5; 12; 24$</p> <p>$\checkmark 2y + 3; y; y$</p> <p>$\checkmark x$</p> <p>$\checkmark 12; (91 - 4y - 1) / (60 - 3y) / 12$</p> <p>(4)</p>	<p>$S = 135$</p>	<p>$P(M \text{ or } P \text{ and/or } A) = \frac{2y + 3 + 5 + 12 + x + 24}{135}$</p> $= \frac{35 + 5 + 12 + 15 + 24}{135}$ $= \frac{91}{135} \text{ or } 0,67$ <p>(3)</p>
<p>10.3</p> <p>$P(M \cup (P \cap A)) = P(M) + P(P \cap A) - P(M \cap P \cap A)$</p> $= \frac{67}{135} + \frac{39}{135} - \frac{15}{135}$ $= \frac{91}{135}$ <p>(3)</p>	<p>ALTERNATIVE SOLUTION</p> <p>$P(M \cup (P \cap A)) = P(M) + P(P \cap A) - P(M \cap P \cap A)$</p> $= \frac{67}{135} + \frac{39}{135} - \frac{15}{135}$ $= \frac{91}{135}$ <p>(3)</p>	<p>\checkmark formula / formule</p> <p>\checkmark substitution / wisselvoering</p> <p>\checkmark answer / antwoord</p> <p>(3)</p>

QUESTION 11/17/14/16/11

ALTERNATIVE SOLUTION: ALTERNATIEVE OPLOSSING

11.2	Probability = $\frac{3 \times 2 \times 3!}{5!}$ $= \frac{3}{10}$	<input checked="" type="checkbox"/> 3 x 2 <input checked="" type="checkbox"/> 3! <input checked="" type="checkbox"/> 5! <input checked="" type="checkbox"/> answer provided	(4)
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We request that this must be brought to the attention of all educators marking these papers and sincerely apologise for the inconvenience.

Yours in quality education.



MS N. MBELEKI
CES: ASSESSMENT INSTRUMENTS
DEVELOPMENT AND QUESTION PAPERS
BANK MANAGEMENT

22 September 2020
DATE