



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NASIONALE SENIOR SERTIFIKAAT

GRAAD 12

WISKUNDE V1

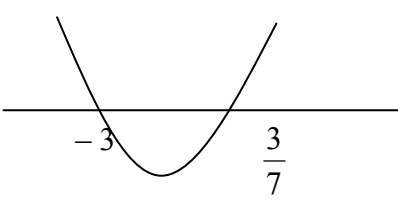
FEBRUARIE/MAART 2011

MEMORANDUM

PUNTE: 150

Hierdie memorandum bestaan uit 20 bladsye.

VRAAG 1

1.1.1	$x^2 - x = 12$ $x^2 - x - 12 = 0$ $(x - 4)(x + 3) = 0$ $x = 4$ or $x = -3$ OF $x(x - 1) = 12$ $4(3) = 12$ $(-3)(-4) = 12$ Deur inspeksie $x = 4$ or $x = -3$	✓ standaardvorm ✓ faktore ✓ antwoorde (3) ✓ faktore ✓✓ antwoorde (3)
1.1.2	$2x^2 + 3x - 7 = 0$ $x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(-7)}}{2(2)}$ $= \frac{-3 \pm \sqrt{65}}{4}$ $x = 1,27$ of $x = -2,77$	✓ substitusie in korrekte formule ✓ 65 ✓✓ antwoorde (4)
1.1.3	$7x^2 + 18x - 9 > 0$ $(7x - 3)(x + 3) > 0$ $\begin{array}{ccccccc} + & 0 & - & 0 & + \\ & -3 & & \frac{3}{7} & \end{array}$  $x < -3$ of $x > \frac{3}{7}$ OF $x \in (-\infty; -3) \cup \left(\frac{3}{7}; \infty\right)$	✓ faktore ✓ $\frac{3}{7}$ en -3 ✓✓ korrekte intervale (4)
1.2	$2x - y = 7$ $y = 2x - 7$ Vervang $y = 2x - 7$ in $x^2 + xy = 21 - y^2$ $x^2 + x(2x - 7) = 21 - (2x - 7)^2$ $x^2 + 2x^2 - 7x = 21 - 4x^2 + 28x - 49$ $7x^2 - 35x + 28 = 0$ $x^2 - 5x + 4 = 0$ $(x - 4)(x - 1) = 0$ $x = 4$ of $x = 1$ $y = 1$ of $y = -5$	✓ $y = 2x - 7$ ✓ substitusie ✓ vermenigvuldiging ✓ standaardvorm ✓ faktore ✓ x-antwoorde ✓ y-antwoorde (7)

	OF $2x - y = 7$ $x = \frac{7+y}{2}$ Vervang $x = \frac{7+y}{2}$ in $x^2 + xy = 21 - y^2$ $\left(\frac{7+y}{2}\right)^2 + \left(\frac{7+y}{2}\right)y = 21 - y^2$ $\frac{49+14y+y^2}{4} + \frac{7y+y^2}{2} = 21 - y^2$ $49+14y+y^2 + 2(7y+y^2) = 84-4y^2$ $49+14y+y^2 + 14y+2y^2 = 84-4y^2$ $7y^2 + 28y - 35 = 0$ $y^2 + 4y - 5 = 0$ $(y+5)(y-1) = 0$ $y = -5 \quad \text{of} \quad y = 1$ $x = 1 \qquad x = 4$	✓ $x = \frac{7+y}{2}$ ✓ substitusie ✓ vermenigvuldiging ✓ standaardvorm ✓ faktore ✓ x-antwoorden ✓ y-antwoorden (7)
1.3	$\left(\sqrt[5]{\sqrt{35} + \sqrt{3}}\right)\left(\sqrt[5]{\sqrt{35} - \sqrt{3}}\right)$ $= \sqrt[5]{(\sqrt{35} + \sqrt{3})(\sqrt{35} - \sqrt{3})}$ $= \sqrt[5]{35-3}$ $= \sqrt[5]{32}$ $= 2$	✓ $\sqrt[5]{(\sqrt{35} + \sqrt{3})(\sqrt{35} - \sqrt{3})}$ ✓ $\sqrt[5]{35-3}$ ✓ antwoord (3) [21]

VRAAG 3

3.1	$S_{\infty} = 8 + \frac{8}{\sqrt{2}} + \dots$ $r = \frac{1}{\sqrt{2}} \text{ en}$ $s_{\infty} = \frac{a}{1-r}$ $= \frac{8}{1 - \frac{1}{\sqrt{2}}}$ $= \frac{8\sqrt{2}}{\sqrt{2}-1}$ $= \frac{8\sqrt{2}(\sqrt{2}+1)}{(\sqrt{2}-1)(\sqrt{2}+1)}$ $= 8\sqrt{2}\sqrt{2} + 8\sqrt{2}$ $= 16 + 8\sqrt{2}$ OF $S_{\infty} = 8 + \frac{8}{\sqrt{2}} + \dots$ $r = \frac{1}{\sqrt{2}} \text{ en}$ $s_{\infty} = \frac{a}{1-r}$ $= \frac{8}{1 - \frac{1}{\sqrt{2}}}$ $= \frac{8\left(1 + \frac{1}{\sqrt{2}}\right)}{\left(1 - \frac{1}{\sqrt{2}}\right)\left(1 + \frac{1}{\sqrt{2}}\right)}$ $= \frac{8\left(1 + \frac{1}{\sqrt{2}}\right)}{\frac{1}{2}}$ $= 16\left(1 + \frac{1}{\sqrt{2}}\right)$ $= 16 + \frac{16\sqrt{2}}{2}$ $= 16 + 8\sqrt{2}$	$\checkmark r = \frac{1}{\sqrt{2}}$ $\checkmark$ substitusie $\checkmark$ rasionalisering $\checkmark$ vereenvoudiging (4) $\checkmark r = \frac{1}{\sqrt{2}}$ $\checkmark$ substitusie $\checkmark$ rasionalisering $\checkmark$ vereenvoudiging (4)
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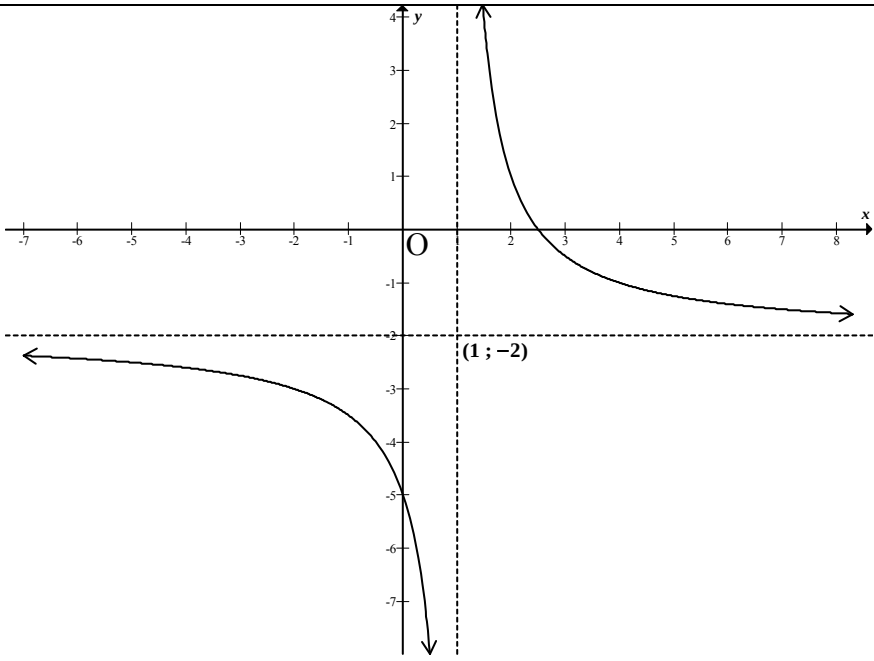
3.2.1	$5 + 15 + 45 + \dots + T_{20}$ $= \sum_{n=1}^{20} 5(3)^{n-1}$ OF $5 + 15 + 45 + \dots + T_{20}$ $= 5 \sum_{n=0}^{19} (3)^n$ OF $5 + 15 + 45 + \dots + T_{20}$ $= 5 \sum_{i=l}^{l+19} (3)^{i-l} \quad \text{vir enige } l \in \mathbb{Z}$	✓ ✓ antwoord (2) ✓ ✓ antwoord (2) ✓ ✓ antwoord (2)
3.2.2	$5 + 15 + 45 + \dots + T_{20}$ $= \frac{5(3^{20} - 1)}{3 - 1}$ $= 8\,716\,961\,000$	✓ formule ✓ substitusie ✓ antwoord (3) [9]

VRAAG 4

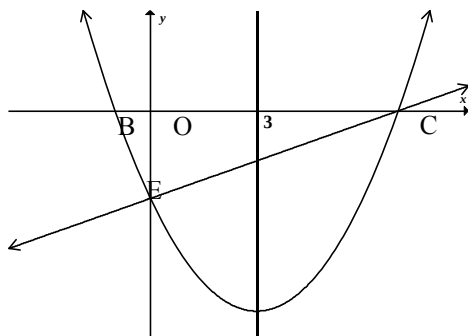
4.1.1	$S_{23} = \frac{23}{2}(5(23) + 9)$ $= 1426$	✓ substitusie ✓ antwoord (2)
4.1.2	$T_{23} = S_{23} - S_{22}$ $= 1426 - \frac{22}{2}(5(22) + 9)$ $= 1426 - 1309$ $= 117$	✓ stelling ✓ $S_{22} = 1309$ ✓ antwoord (3)
4.2	Rekenkundige Ry: $12; 12 + d; 12 + 2d$ Meetkundige Ry: $12; 12r; 12r^2$ $12 + d = 12r$ $d = 12r - 12$ $12 + 12r + 12r^2 = 12 + 12 + d + 12 + 2d + 3$ $12r^2 = 12 + 2(12r - 12) + 3$ $12r^2 = 12 + 24r - 24 + 3$ $12r^2 - 24r + 9 = 0$ $4r^2 - 8r + 3 = 0$ $(2r - 3)(2r - 1) = 0$ $r = \frac{3}{2} \quad \text{of} \quad r = \frac{1}{2}$	✓ vergelyking ✓ vergelyking ✓ standaardvorm ✓ faktore ✓ antwoorde (6)

	OF Die 3^{de} term van MR = 3 + 3^{de} term van RR $12r^2 = 3 + 12 + 2d$ $12r^2 = 15 + 24r - 24$ $12r^2 - 24r + 9 = 0$ $4r^2 - 8r + 3 = 0$ $(2r - 3)(2r - 1) = 0$ $r = \frac{3}{2} \text{ of } r = \frac{1}{2}$	✓ vergelyking ✓ vergelyking ✓ standaardvorm ✓ faktore ✓ antwoorde [11]
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VRAAG 5

5.1	$x = 1$ $y = -2$	✓✓ antwoorde (2)
5.2	y-afsnit: $y = \frac{3}{0-1} - 2 = -5$ x-afsnit: $\left(\frac{5}{2}; 0\right)$ $0 = \frac{3}{x-1} - 2$ $2 = \frac{3}{x-1}$ $2x - 2 = 3$ $2x = 5$ $x = \frac{5}{2}$	✓ $y = -5$ ✓ vervang $y = 0$ ✓ antwoord (3)
5.3		✓ asimptote ✓ y-afsnit ✓ vorm (3)

5.4	$-f(x) = \frac{-3}{x-1} + 2$ $y \in \mathbb{R} - \{2\}$ OF $y \in (-\infty; 2) \cup (2; \infty)$ OF $y \in \mathbb{R}; y \neq 2$	✓ antwoord (1)
5.5	$g(x) = \frac{-3}{x+1} - 2$ $= \frac{3}{-x-1} - 2$ Refleksie van f in die y -as. OF (i) horisontale skuif met 2 eenhede na links, gevolg deur (ii) refleksie in x -as, gevolg deur (iii) vertikale afwaartse skuif van 4 eenhede	✓ manipulasie ✓ antwoord (2) [11]

VRAAG 6

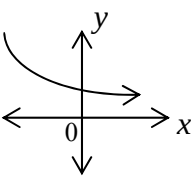
6.1	$\frac{x}{2} - \frac{7}{2} = 0$ $x = 7$ $C(7; 0)$ OF $y = \frac{7}{2} - \frac{7}{2}$ $y = 0$ $C(7; 0)$	$\frac{x}{2} - \frac{7}{2} = 0$ (1) ✓ substitusie ✓ antwoord (2)
6.2	x - koördinaat van B is $3 - 4 = -1$	✓ antwoord (1)

6.3	OPSIE 1 $f(x) = a(x-3)^2 + q$ By B en C: $0 = 16a + q$ By E: $-\frac{7}{2} = 9a + q$ Gelyktydige oplossing gee $a = \frac{1}{2} \text{ en } q = -8$ OPSIE 2 $f(x) = a(x+1)(x-7)$ $y = a(x+1)(x-7)$ $-3,5 = a(0+1)(0-7)$ $-3,5 = -7a$ $a = \frac{1}{2}$ $f(x) = \frac{1}{2}(x+1)(x-7)$ $= \frac{1}{2}(x^2 - 6x - 7)$ $= \frac{1}{2}[(x-3)^2 - 16]$ $= \frac{1}{2}(x-3)^2 - 8$ OPSIE 3 $a = \frac{1}{2}$ As van simmetrie: $x = 3$ of $x = \frac{-1+7}{2} = 3$ $f(x) = \frac{1}{2}(x-3)^2 + q$ $0 = \frac{1}{2}(7-3)^2 + q$ $q = -8$ $y = \frac{1}{2}(x-3)^2 - 8$	✓ substitusie ✓ substitusie ✓ substitusie ✓✓ $a = \frac{1}{2}$ ✓ $q = -8$ (6) ✓ substitudie ✓ substitusie ✓ $a = \frac{1}{2}$ ✓ substitusie ✓ vereenvoudiging ✓ antwoord (6) ✓✓✓ $a = \frac{1}{2}$ ✓ substitusie ✓ substitusie ✓ antwoord (6)
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	OPSIE 4 $a = \frac{1}{2}$ As van simmetrie: $x = 3$ $f(x) = \frac{1}{2}(x-3)^2 + q$ $q = f(3)$ $q = \frac{1}{2}(3+1)(3-7)$ $q = -8$ $y = \frac{1}{2}(x-3)^2 - 8$	✓✓✓ $a = \frac{1}{2}$ ✓ substitusie ✓ substitusie ✓ antwoord (6)
6.4	$h(x) = -f(x) = -\frac{1}{2}(x-3)^2 + 8$	✓ antwoord (1)
6.5	$1 - f(x) = -\frac{1}{2}(x-3)^2 + 9$ ∴ Maksimum waarde is 9. OF Maksimum waarde = $1 - (-8)$ = 9 OF $t(x) = -\frac{1}{2}x^2 + 3x + \frac{9}{2}$ $t'(x) = -x + 3 = 0$ $\text{Maks } V_{\text{by } x=3} = -\frac{1}{2}(3)^2 + 3(3) + \frac{9}{2} = 9$	✓ metode ✓ antwoord (2)
6.6	$f(x^2 - 2) = 0$ $f(x) = 0 \text{ as } x = -1 \text{ of } x = 7$ $\therefore f(x^2 - 2) = 0 \text{ as } x^2 - 2 = -1 \text{ of } x^2 - 2 = 7$ $\therefore x^2 = 1 \text{ of } x^2 = 9$ $\therefore x = 1 \text{ of } x = -1 \text{ of } x = 3 \text{ of } x = -3$	✓ substitusie ✓ vereenvoudiging ✓ antwoord ✓ antwoord (4)

	OF $\frac{1}{2}(x^2 - 2 - 3)^2 - 8 = 0$ $\frac{1}{2}(x^2 - 5)^2 = 8$ $(x^2 - 5)^2 = 16$ $x^2 - 5 = 4 \quad \text{of} \quad x^2 - 5 = -4$ $x^2 = 9 \quad \text{of} \quad x^2 = 1$ $x = 3 \quad \text{of} \quad x = -3 \quad \text{of} \quad x = 1 \quad \text{of} \quad x = -1$ OF $f(x^2 - 2) = 0$ $\frac{1}{2}(x^2 - 2 - 3)^2 - 8 = 0$ $\frac{1}{2}(x^2 - 5)^2 = 8$ $(x^2 - 5)^2 - 16 = 0$ $(x^2 - 5 - 4)(x^2 - 5 + 4) = 0$ $(x^2 - 9)(x^2 - 1) = 0$ $(x - 3)(x + 3)(x - 1)(x + 1) = 0$ $x = 3 \quad \text{of} \quad x = -3 \quad \text{of} \quad x = 1 \quad \text{of} \quad x = -1$	✓ substitusie ✓ vereenvoudiging ✓ faktore ✓ antwoord (4) ✓ substitusie ✓ vereenvoudiging ✓ faktore ✓ antwoord (4) [15]
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VRAAG 7

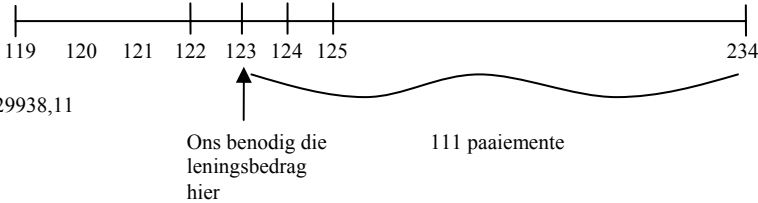
7.1	Dalende funksie Omdat $0 < a < 1$ OF Soos x toeneem, neem $f(x)$ af	✓ dalende ✓ $a < 1$ (2)
7.2	$f^{-1}: x = \left(\frac{1}{3}\right)^y$ OF  $y = \log_{\frac{1}{3}} x$ OF $f^{-1}: x = \left(\frac{1}{3}\right)^y$ $y = -\log_3 x$	✓ $x = \left(\frac{1}{3}\right)^y$ ✓ $y = \log_{\frac{1}{3}} x$ of $y = -\log_3 x$ (2)
7.3	$y = -5$	✓ antwoord (1)

7.4	Refleksie in $y = x$. Refleksie in die x-as. OF Refleksie in die y-as. Dan 'n refleksie in die lyn $y = x$. OF Refleksie om die lyn $y = -x$ gevolg deur refleksie om die y-as. OF Rotasie deur 90° in 'n kloksgewyse rigting. OF Rotasie deur 90° in 'n anti-kloksgewyse rigting. Refleksie in die oorsprong.	✓ refleksie in $y = x$ ✓ refleksie in die y-as (2) ✓ refleksie in y-as ✓ refleksie in $y = x$ (2) ✓ rotasie deur 90° ✓ kloksgewyse rigting (2) ✓ antwoord ✓ antwoord (2) [7]
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VRAAG 8

8.1	$A = P(1 + i)^n$ $1711,41 = 1430,77 \left(1 + \frac{i}{12}\right)^{18}$ $\left(1 + \frac{i}{12}\right)^{18} = 1,196146131... \quad \text{OF} \quad \left[\frac{1711,41}{1430,77}\right]^{\frac{1}{18}} = 1,00999...$ $1 + \frac{i}{12} = 1,009999937... \quad \therefore i = 12(1,01 - 1)$ $i = 0,1199992431... = 0,12$ $i = 12\%$ Koers = 12, 00% p.j. maandeliks saamgestel.	✓ substitusie ✓ $\left(1 + \frac{i}{12}\right)^{18} = 1,196146131...$ ✓ $1 + \frac{i}{12} = 1,009999937...$ ✓ antwoord (4)
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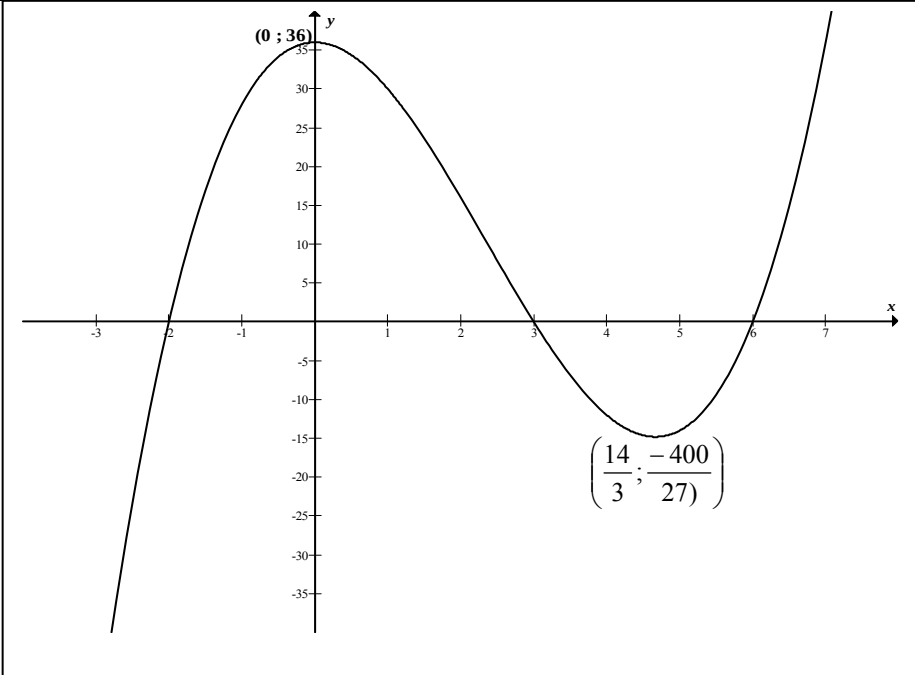
8.2.1	$P_v = \frac{x[1 - (1 + i)^{-n}]}{i}$ $800000 = \frac{10000 \left[1 - \left(1 + \frac{0,14}{12} \right)^{-n} \right]}{\frac{0,14}{12}}$ $1 - \left(1 + \frac{0,14}{12} \right)^{-n} = \frac{14}{15} \quad (= 0,933333)$ $\left(1 + \frac{0,14}{12} \right)^{-n} = \frac{1}{15} \quad (= 0,06666666)$ $\log \left(1 + \frac{0,14}{12} \right)^{-n} = \log \frac{1}{15}$ $-n \log \left(1 + \frac{0,14}{12} \right) = \log \frac{1}{15} \quad \left(\begin{array}{l} -n = \frac{\log \frac{1}{15}}{\log \left(1 + \frac{0,14}{12} \right)} \\ = -233,47 \end{array} \right)$ $n = 233,47$ ∴ die lening sal opbetaald wees aan die einde van die 234^{ste} maand OF Uitstaande balans na 233^{ste} maand $= 800000 \left(1 + \frac{0,14}{12} \right)^{233} - \frac{10000 \left[\left(1 + \frac{0,14}{12} \right)^{233} - 1 \right]}{\frac{0,14}{12}}$ $= R4\,660,04 \text{ wat minder is as } R10\,000$ Daarom sal die lening na 234 maande opbetaald wees. OF Totale waarde van die lening na 234 paaiemente $= \frac{10000 \left(1 - \left(1 + \frac{0,14}{12} \right)^{-234} \right)}{\frac{0,14}{12}}$ $= R800\,350,21$ > R800 000 en die verskil is minder as R10 000 Daarom sal die lening na 234 maande opbetaald wees.	✓ vervang in P_v ✓ $i = \frac{0,14}{12}$ ✓ gebruik van logs ✓ antwoord (4) ✓ substitusie in P formule ✓ 234 ✓ antwoord ✓ argument (4) ✓ substitusie in F formule ✓ 234 ✓ antwoord ✓ argument (4)
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8.2.2	Uitstaande balans na 119 maande $= 800000 \left(1 + \frac{0,14}{12}\right)^{119} - \frac{10000 \left[\left(1 + \frac{0,14}{12}\right)^{119} - 1 \right]}{\frac{0,14}{12}}$ $= R629\,938,11$  Totaal betaalbaar aan die einde van die 123^{ste} maand $= 629\,938,11 \left(1 + \frac{0,14}{12}\right)^4$ $= R\,659\,853,68$ Nuwe paaiement: $659\,853,68 = \frac{x \left[1 - \left(1 + \frac{0,14}{12}\right)^{-111} \right]}{\frac{0,14}{12}}$ $x = R10\,632,39$	✓ $800000 \left(1 + \frac{0,14}{12}\right)^{119}$ ✓ $\frac{10000 \left[\left(1 + \frac{0,14}{12}\right)^{119} - 1 \right]}{\frac{0,14}{12}}$ ✓ R629 938,11 ✓ $629938,11 \left(1 + \frac{0,14}{12}\right)^4$ ✓ R 659 853,68 ✓ substitusie in P_v ✓ antwoord (7) [15]
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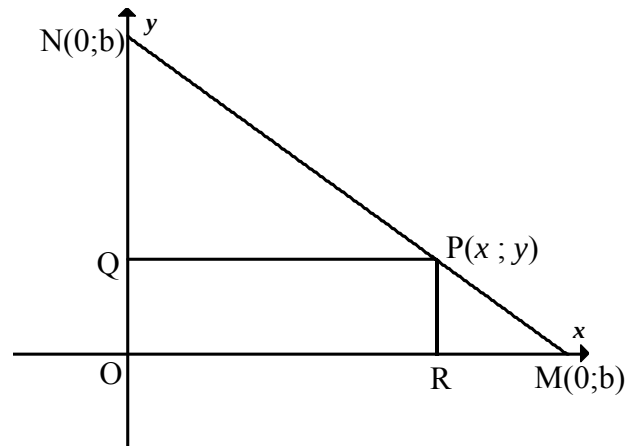
VRAAG 9

9.1	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \rightarrow 0} \frac{1 - 3(x+h)^2 - (1 - 3x^2)}{h}$ $= \lim_{h \rightarrow 0} \frac{1 - 3x^2 - 6xh - 3h^2 - 1 + 3x^2}{h}$ $= \lim_{h \rightarrow 0} \frac{-6xh - 3h^2}{h}$ $= \lim_{h \rightarrow 0} \frac{h(-6x - 3h)}{h}$ $= \lim_{h \rightarrow 0} (-6x - 3h)$ $= -6x$	✓ substitusie in formule ✓ $1 - 3x^2 - 6xh - 3h^2$ ✓ $h(-6x - 3h)$ ✓ antwoord (4)
9.2	$D_x \left[4 - \frac{4}{x^3} - \frac{1}{x^4} \right]$ $= D_x \left[4 - 4x^{-3} - x^{-4} \right]$ $= 12x^{-4} + 4x^{-5}$	✓ vereenvoudiging ✓✓ antwoord (3)
9.3	$y = (1 + \sqrt{x})^2$ $y = 1 + 2\sqrt{x} + x$ $y = 1 + 2x^{\frac{1}{2}} + x$ $\frac{dy}{dx} = x^{-\frac{1}{2}} + 1$	✓ uitbreiding ✓ $x^{-\frac{1}{2}}$ ✓ 1 (3) [10]

VRAAG 10

10.1	$(-6)(-3)(+2) = 36$ y -afsnit is 36 OF $g(x) = (x-6)(x^2 - x - 6)$ $g(x) = x^3 - 7x^2 + 36$ y -afsnit : (0;36)	$\checkmark (-6)(-3)(+2)$ $\checkmark y$ -afsnit is 36 (1) $\checkmark$ drieterm $\checkmark 36$ (1)
10.2	$g(x) = 0$ $x = 6$ of $x = 3$ of $x = -2$ afsnitte is (6 ; 0) en (3 ; 0) en (-2; 0)	$\checkmark g(x) = 0$ $\checkmark$ alle x -afsnitte (2)
10.3	$g(x) = (x-6)(x^2 - x - 6)$ $= x^3 - 7x^2 + 36$ $g'(x) = 3x^2 - 14x$ $0 = x(3x - 14)$ $x = 0$ of $x = \frac{14}{3}$ Draaipunte is (0 ; 36) en $\left(\frac{14}{3}; -\frac{400}{27}\right)$	$\checkmark x^3 - 7x + 36$ $\checkmark g'(x) = 3x^2 - 14x$ $\checkmark g'(x) = 0$ $\checkmark$ antwoorde $\checkmark \checkmark$ punte (6)
10.4		$\checkmark x$ -afsnitte $\checkmark \checkmark$ draaipunte $\checkmark$ vorm (4)

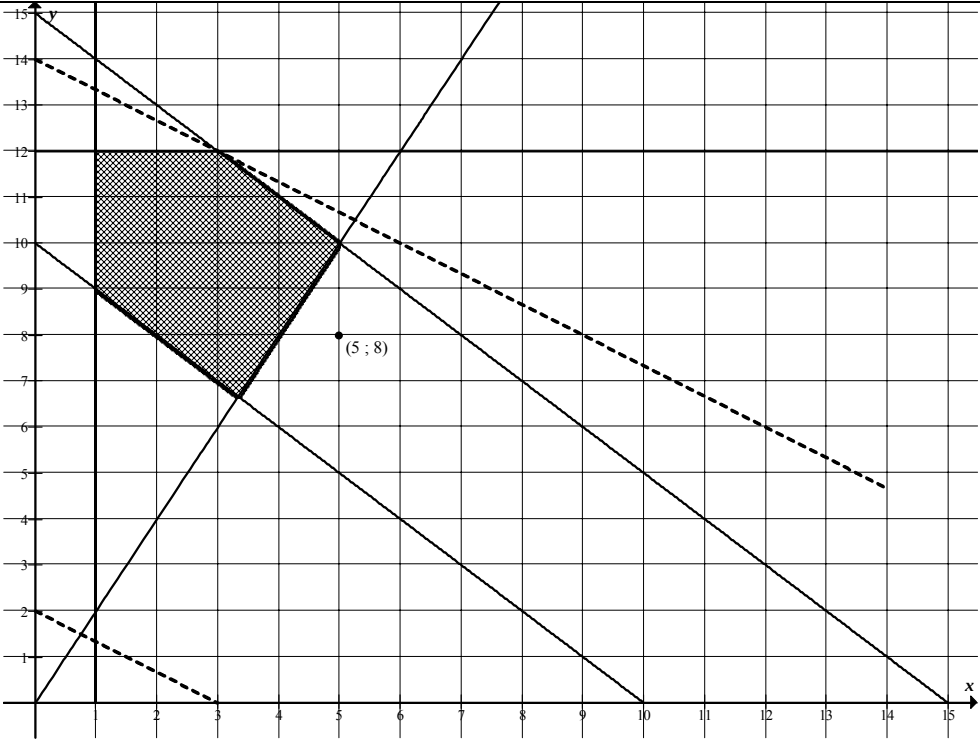
10.5	$g(x).g'(x < 0$ $x < -2$ of $0 < x < 3$ of $\frac{14}{3} < x < 6$	1 punt vir elke ongelykheid (3) [16]
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VRAAG 11

11.1	$m = -\frac{b}{a}$ $y - b = \frac{-b}{a}(x - 0)$ $y = \frac{-b}{a}x + b$ OF $y = mx + b$ $0 = ma + b$ $m = \frac{-b}{a}$ $y = -\frac{b}{a}x + b$ OF $\frac{x}{a} + \frac{y}{b} = 1$	✓ $m = -\frac{b}{a}$ ✓ antwoord (2)
11.2	$A = xy$ $A = x\left(\frac{-bx}{a} + b\right)$ $= -\frac{b}{a}x^2 + bx$ $\frac{dA}{dx} = -\frac{2b}{a}x + b$ $0 = -\frac{2b}{a}x + b$ $-ba = -2bx$ $x = \frac{a}{2}$ $y = -\frac{b}{a}\left(\frac{a}{2}\right) + b$ $= \frac{b}{2}$ $P\left(\frac{a}{2}; \frac{b}{2}\right)$ wat die middelpunt van MN is OF	✓ area formule ✓ substitusie ✓ $\frac{dA}{dx} = -\frac{2b}{a}x + b$ ✓ $\frac{dA}{dx} = 0$ ✓ x-waarde ✓ y-waarde (6)

	$\frac{x}{a} + \frac{y}{b} = 1$ $\frac{y}{b} = 1 - \frac{x}{a}$ Om xy te maksimeer, maksimeer ons $\frac{xy}{ab} = \frac{x}{a} \left(\frac{y}{b} \right) = \frac{x}{a} \left(1 - \frac{x}{a} \right)$ Dit is 'n maksimum wanneer $\frac{x}{a} = \frac{1}{2}$ d.i. $x = \frac{a}{2}$ Volgens die middelpuntstelling is P dan die middelpunt van MN.	(6) [8]
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VRAAG 12

12.1	$x \geq 1$ $y \leq 12$ $x + y \geq 10$ $x + y \leq 15$ $y \geq 2x$ $x, y \in N_0$	✓ $x \geq 1$ ✓ $y \leq 12$ ✓ $x + y \geq 10$ ✓ $x + y \leq 15$ ✓✓ $y \geq 2x$ (6)
12.2		✓ $x \geq 1$; ✓ $y \leq 12$ ✓ $x + y \leq 15$ ✓ $x + y \geq 10$ ✓ $y \geq 2x$ ✓ toelaatbare gebied (7)
12.3	Nee. Die punt (5 ; 8) lê buite die toelaatbare gebied OF 8 is nie groter as $2(5) = 10$	✓ Nee ✓ Rede (2)

12.4	$I = 600x + 900y$ $y = -\frac{2}{3}x + \frac{I}{900}$ Maksimum Inkomste by (3 ; 12) 3 enkel slaapkamers en 12 dubbel slaapkamers OF Om die profyt/wins te optimaliseer, moet die groep so veel as moontlik kamers bou en dan, so veel as moontlik dubbelkamers. So 15 kamers, 12 dubbelkamers en 3 enkelkamers.	✓ doelfunksie ✓ soeklyn ✓ antwoord (3) [18]
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TOTAAL: 150

