Department of
Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION
VOORBEREIDENDE EKSAMEN

GRADE/*GRAAD* 12

MATHEMATICS P1
WISKUNDE V1

SEPTEMBER 2021

MARKS/*PUNTE*: 150

MARKING GUIDELINES
NASIENRIGLYNE

These marking guidelines consists of 19 pages.
Hierdie nasienriglyne bestaan uit 19 bladsye.

NOTE:
* If a candidate answered a question TWICE, mark only the FIRST attempt.
* If a candidate has crossed out an attempt to answer a question and did not redo it, mark the crossed-out version.
* Consistent accuracy applies in ALL aspects of the marking memorandum. Stop marking at the second calculation error.
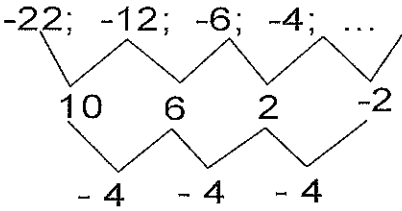* Assuming answers/values in order to solve a problem is NOT acceptable.

NOTA:
* *As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
* *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.*
* *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
* *Om antwoorde/waardes te aanvaar om 'n probleem op te los, word NIE toegelaat NIE.*

QUESTION/*VRAAG* 1

1.1.1	$x^2 - 4x - 21 = 0$ $(x - 7)(x + 3) = 0$ $x = 7$ *or/of* $x = -3$	✓ factors ✓ $x = 7$ ✓ $x = -3$ (3)

1.1.2	$x(5x - 1) = 3$
	 $5x^2 - x - 3 = 0$
	
	 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
	
	 $x = \dfrac{-(-1) \pm \sqrt{(-1)^2 - 4(5)(-3)}}{2(5)}$
	
	 $= \dfrac{1 \pm \sqrt{61}}{10}$
	
	 $x = 0{,}88$ or/*of* $x = -0.68$
	
	 OR/*OF*
	
	 $5x^2 - x - 3 = 0$
	 $x^2 - \dfrac{1}{5}x + \dfrac{1}{100} = \dfrac{3}{5} + \dfrac{1}{100}$
	
	 $\left(x - \dfrac{1}{10}\right)^2 = \dfrac{61}{100}$
	
	 $x - \dfrac{1}{10} = \dfrac{\pm\sqrt{61}}{10}$
	
	 $x = \dfrac{1 \pm \sqrt{61}}{10}$
	 $x = 0{,}88$ *or/of* $x = -0{,}638$
		✓ standard form
		
		 ✓ substitution into correct formula
		
		 ✓ $x = 0{,}88$ ✓ $x = -0.68$
		
		                        (4)
		
		 OR/*OF*
		 ✓ standard form
		
		 ✓ $x^2 - \dfrac{1}{5}x + \dfrac{1}{100} = \dfrac{3}{5} + \dfrac{1}{100}$
		
		 ✓ $x = 0{,}88$ ✓ $x = -0.68$
		
		                        (4)

1.1.3	$2x^2 - 9x + 4 \geq 0$ $(2x - 1)(x - 4) \geq 0$ $x \leq \dfrac{1}{2}$ *or/of* $x \geq 4$	✓ factors ✓✓ answers (**combo marks**) (3)
1.1.4	$3^{x+1} - 3^{x-1} - 24 = 0$ $3^x\left(3 - 3^{-1}\right) = 24$ $3^x\left(\dfrac{8}{3}\right) = 24$ $3^x = 3^2$ $\therefore \quad x = 2$	✓ $3^x\left(3 - 3^{-1}\right) = 24$ ✓ $3^x\left(\dfrac{8}{3}\right) = 24$ ✓ $3^x = 3^2$ ✓ answer (4)

1.2	$y + 2x = 2$ and/en $y^2 - 3yx = -2x^2$	
	$y = 2 - 2x$	
	$y^2 - 3yx = -2x^2$	✓ $y = 2 - 2x$
	$(2 - 2x)^2 - 3x(2 - 2x) = -2x^2$	✓ substitution
	$4 - 8x + 4x^2 - 6x + 6x^2 = -2x^2$	
	$12x^2 - 14x + 4 = 0$	
	$6x^2 - 7x + 2 = 0$	
	$(3x - 2)(2x - 1) = 0$	✓ standard form
	$\therefore x = \dfrac{2}{3}$ or/*of* $x = \dfrac{1}{2}$	✓ both x values
	$\therefore y = 2 - 2\left(\dfrac{2}{3}\right)$ or/*of* $y = 2 - 2\left(\dfrac{1}{2}\right)$	
	$y = \dfrac{2}{3}$ $y = 1$	✓ both y values
		(5)
1.3	$\left(\sqrt[4]{\sqrt{20} - \sqrt{D_x(4x)}}\right)\left(\sqrt[4]{\sqrt{20} + \sqrt{D_x(4x)}}\right)$	
	$= \left(\sqrt[4]{\sqrt{20} - \sqrt{4}}\right)\left(\sqrt[4]{\sqrt{20} + \sqrt{4}}\right)$	✓ $\left(\sqrt[4]{\sqrt{20} - \sqrt{4}}\right)\left(\sqrt[4]{\sqrt{20} + \sqrt{4}}\right)$
	$= \left(\sqrt[4]{\sqrt{20} - 2}\right)\left(\sqrt[4]{\sqrt{20} + 2}\right)$	✓ $\left(\sqrt[4]{\sqrt{20} - 2}\right)\left(\sqrt[4]{\sqrt{20} + 2}\right)$
	$= \sqrt[4]{20 - 4}$	✓ $\sqrt[4]{20 - 4}$
	$= \sqrt[4]{16}$	
	$= 2$	✓ answer
		(4)
		[23]

QUESTION/*VRAAG* 2

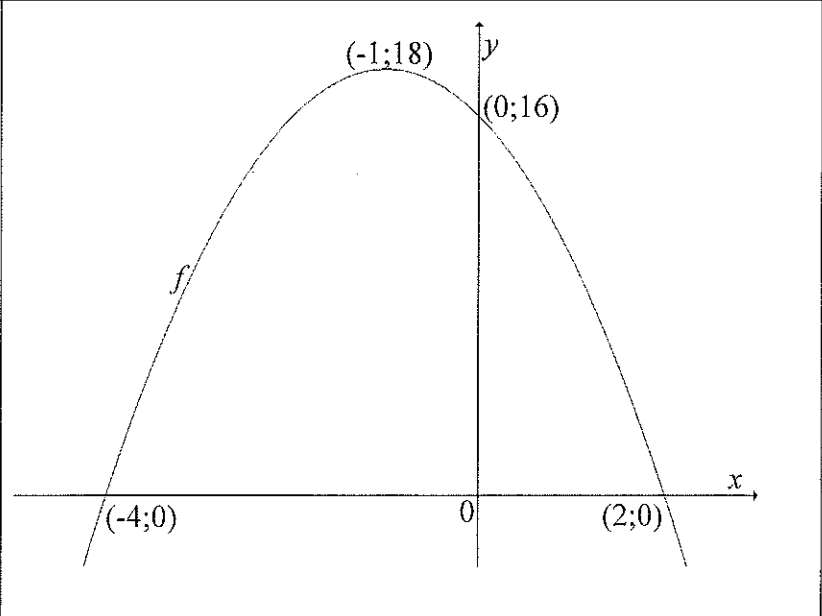|		
2.1.1	 The next two terms are/*die volgende twee terme is* -6 and/*en* -12	✓ -6 ✓ -10 (2)
2.1.2	$2a = -4 \qquad 3(-2) + b = 10 \qquad -2 + 16 + c = -22$ $\therefore a = -2 \quad \therefore \ b = 16 \qquad \therefore \ c = -36$ $\therefore \ T_n = -2n^2 + 16n - 36$ Answer only: Full marks/ *Slegs antwoord: Volpunte*	✓ $a = -2$ ✓ $b = 16$ ✓ $c = -36$ ✓ $T_n = -2n^2 + 16n - 36$ (4)
2.1.3	$\therefore \ T_n = -2n^2 + 16n - 36$ $n = -\dfrac{b}{2a}$ $= -\dfrac{16}{2(-2)}$ $n = 4$ Answer only: Full marks/ *Slegs antwoord: Volpunte* **OR/*OF*** $T'_n = -4n + 16$ $0 = -4n + 16$ $\therefore \ n = 4$	✓ substitution ✓ answer (2) **OR/*OF*** ✓ $0 = -4n + 16$ ✓ answer (2)
2.2.1	$d = -6$	✓ answer (1)
2.2.2	$T_n = 27 - 6(n + 1)$ $-117 = 27 - 6(n + 1)$ $\quad 6n = 138$ $\therefore \ n = 23$	✓ $-117 = 27 - 6(n + 1)$ ✓ answer (2)
2.3.1	$5 + 9 + 13 + \ldots.$ $S_n = \dfrac{n}{2}\big[2a + (n - 1)d\big]$ $S_n = \dfrac{n}{2}\big[2(5) + (n - 1)4\big]$ $= \dfrac{n}{2}\big[10 + 4n - 4\big]$ $S_n = 2n^2 + 3n$	✓Substitution into the correct formula ✓ answer (2)

2.3.2	$S_n = 2n^2 + 3n$	
	$\therefore S_{n-6} = 2(n-6)^2 + 3(n-6)$	$\checkmark\ S_{n-6} = 2(n-6)^2 + 3(n-6)$
	$\qquad = 2n^2 - 24n + 72 + 3n - 18$	$\checkmark\ S_{n-6} = 2n^2 - 21n + 54$
	$\qquad = 2n^2 - 21n + 54$	(2)
	OR/OF	**OR/OF**
	$S_{n-6} = S_n - 906$	$\checkmark\ S_{n-6} = S_n - 906$
	$\qquad = 2n^2 + 3n - 906$	$\checkmark\quad S_{n-6} = 2n^2 + 3n - 906$
		(2)
2.3.3	$906 = S_n - S_{n-6}$	$\checkmark$ setting up the equation
	$906 = 2n^2 + 3n - (2n^2 - 21n + 54)$	$\checkmark$ substitution
	$906 = 24n - 54$	
	$960 = 24n$	$\checkmark$ simplification ($960 = 24n$)
	$\therefore n = 40$	$\checkmark$ answer
		(4)
		[19]

QUESTION/*VRAAG* 3

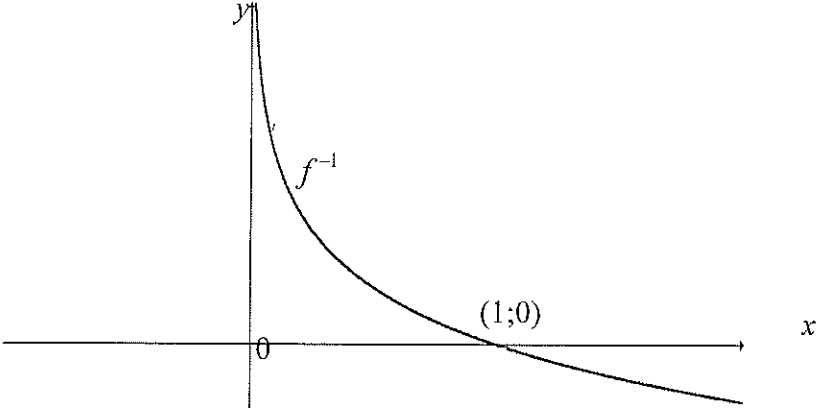| 3.1 | $T_n > \dfrac{3}{16384}$ $a.r^{n-1} > \dfrac{3}{16384}$ $3\left(\dfrac{1}{2}\right)^{n-1} > \dfrac{3}{16384}$ $\left(\dfrac{1}{2}\right)^{n-1} > \left(\dfrac{1}{2}\right)^{14}$ or/of $2^{-n+1} > 2^{-14}$ $\therefore n - 1 < 14$ $\therefore \quad -n + 1 > -14$ $\qquad n < 15 \qquad\qquad\qquad n < 15$ $\therefore \quad n = 14 \qquad\qquad\quad \therefore \quad n = 14$

 OR/*OF*

 $1;\, 2;\, 4;\, \ldots$ $ar^{n-1} < 16384$ $1.2^{n-1} < 16384$ $2^{n-1} < 2^{14}$ $\therefore n - 1 < 14$ $\qquad n < 15$ $\therefore \quad n = 14$ | ✓ substituting into the correct formula

 ✓ method/same base

 ✓ calculating n

 ✓ answer
                           (4)

 ✓ substituting into the correct formula

 ✓ method/ $2^{n-1} < 2^{14}$

 ✓ calculating n
 ✓ answer
                           (4) |
| 3.2 | $\displaystyle\sum_{n=1}^{30} 3\left(\dfrac{1}{2}\right)^{n-1} = 3 + \dfrac{3}{2} + \dfrac{3}{4} + \ldots$ $\displaystyle\sum_{k=1}^{\infty} 27p^k = 27p + 27p^2 + 27p^3 + \ldots$

 $\dfrac{a}{1-r} = \dfrac{a(1 - r^n)}{1 - r}$

 $\dfrac{27p}{1-p} = \dfrac{3\left(1 - \left(\frac{1}{2}\right)^{30}\right)}{1 - \frac{1}{2}}$

 $\dfrac{27p}{1-p} = 6$

 $27p = 6 - 6p$

 $\therefore p = \dfrac{2}{11}$ | ✓ Both expansions

 ✓ Substitution into S_∞ formula

 ✓ Substitution into S_n formula

 ✓ simplification: $\dfrac{27p}{1-p} = 6$

 ✓ answer
                           (5) |
| | | **[9]** |

QUESTION/*VRAAG* 4

4.1	Y-intercept/-*snypunt*: $(0\,;16\,)$	✓ y intercept: $(0\,;16\,)$ (1)
4.2	X-intercept/-*snypunt*: $0 = -2x^2 - 4x + 16$ $0 = x^2 + 2x - 8$ $0 = (x+4)(x-2)$ $\therefore\ \ x = -4\ \ or/of\ \ x = 2$	✓ $y = 0$ ✓ both x values (2)
4.3	$x = -\dfrac{b}{2a}$ $x = -\dfrac{(-4)}{2(-2)} = -1$ $f(-1) = -2(-1)^2 - 4(-1) + 16$ $f(-1) = 18$ Turning point/*draaipunt*$(-1; 18)$ **OR/OF** $f^{\prime}(x) = 2x + 2$ $\quad 0 = 2x + 2$ $\therefore\ \ x = -1$ $f(-1) = -2(-1)^2 - 4(-1) + 16$ $f(-1) = 18$ Turning point/*draaipunt*$(-1; 18)$	✓ method ✓ $x = -1$ ✓ Turning point : $(-1;18)$ (3) **OR/OF** ✓ method ✓ $x = -1$ ✓ Turning point : $(-1;18)$ (3)
4.4		✓ shape ✓ x and y intercepts ✓ turning point (3)

4.5	Range/*waardeversameling*: $y \in (-\infty; 18]$ **OR/OF** $y \leq 18$	$\checkmark\checkmark$ answer (2) **OR/OF** $\checkmark\checkmark$ answer (2)
		[11]

QUESTION/*VRAAG* 5

5.1	$f(x) = \left(\dfrac{1}{2}\right)^x$ $x = \left(\dfrac{1}{2}\right)^y$ $\therefore\ y = \log_{\frac{1}{2}} x$	✓ $x = \left(\dfrac{1}{2}\right)^y$ ✓ answer (2)
5.2	$x \in R, x > 0$ or/of $x \in (0; \infty)$	✓ answer (1)
5.3		✓ shape and asymptote $x = 0$ ✓ x intercept (2)
5.4	$h(x) = x + 3$ $\quad 1\ = x + 3$ $\therefore\quad x = -2$ $\quad B(-2; 1)$	✓ Substitution: $\quad 1\ = x + 3$ ✓ answer: $\quad B(-2; 1)$ (2)
5.5	$g(x) = \dfrac{a}{x+2} + 1$ $0 = \dfrac{a}{0+2} + 1$ $-1 = \dfrac{a}{2}$ $\therefore\ a = -2$ $g(x) = \dfrac{-2}{x+2} + 1$	✓ substitute $\quad p = 2$ and $\quad q = 1$ ✓ substitute $(0;0)$ ✓ $a = -2$ ✓ answer: $g(x) = \dfrac{-2}{x+2} + 1$ (4)
5.6	$k(x) = \dfrac{-2}{x-1} + 2$	✓ $+2$ ✓ -1 (2)
5.7.1	$-2 < x \le 0$	✓ critical values ✓ notation (2)

5.7.2	$x \in R; x \neq -2$	✓ ✓ answer
		(2)
		[17]

QUESTION/*VRAAG* 6

6.1	One x value is associated with two y values/*Een x-waarde word met twee y-waardes geassosieer.* **OR/OF** Vertical line test cuts the graph twice/*Vertikale lyntoets sny die grafiek twee keer.*	✓✓ answer **OR/OF** ✓✓ answer (2)
6.2	$x \leq 0$ or/*of* $x \geq 0$	✓ $x \leq 0$ ✓ $x \geq 0$ (2)
6.3	$y = \sqrt{\dfrac{x}{2}}$ $x = \sqrt{\dfrac{y}{2}}$ $x^2 = \dfrac{y}{2}$ $y = 2x^2$ $\therefore \dfrac{dy}{dx} = 4x$	✓ $x = \sqrt{\dfrac{y}{2}}$ ✓ $y = 2x^2$ ✓ $\dfrac{dy}{dx} = 4x$ (3)
		[7]

QUESTION/*VRAAG* 7

7.1	$1 + i_{eff} = \left(1 + \dfrac{i_{nom}}{n}\right)^n$ $1 + i_{eff} = \left(1 + \dfrac{0,12}{2}\right)^2$ $\therefore \ i_{eff} = 12,36\%$	✓ substitution into the correct formula ✓ answer (2)
7.2	$A = P(1 - i)^n$ $\dfrac{P}{2} = P(1 - 0,07)^n$ $\dfrac{1}{2} = (0,93)^n$ $n = log_{0,93} \dfrac{1}{2}$ $\therefore \ n = 9,55$ years/*jare*	✓ substitution into the correct formula ✓ correct use of logs ✓ answer (3)
7.3.1	$A = P(1 + i)^n$ $A = R250\ 000\left(1 + \dfrac{0,095}{4}\right)^{48}$ $A = R771\ 343,67$	✓ $i = \dfrac{0,095}{4}$ and $n = 48$ ✓ substitution into the correct formula ✓ answer (3)
7.3.2	Home loan/*Huislening* = R2 920 000 − R771 343,67 = R2 148 656,33	✓ answer (1)
7.3.3	$i = \dfrac{0,103}{12}$ and/en $n = 240$ $P = \dfrac{x\left[1 - (1 + i)^{-n}\right]}{i}$ $R2\ 148\ 656,33 = \dfrac{x\left[1 - \left(1 + \dfrac{0,103}{12}\right)^{-240}\right]}{\dfrac{0,103}{12}}$ $\therefore \ x = R21\ 163,87$ **OR/*OF*** $F = \dfrac{x\left[(1 + i)^n - 1\right]}{i}$ $R2\ 148\ 656,33\left(1 + \dfrac{0,103}{12}\right)^{240} = \dfrac{x\left[\left(1 + \dfrac{0,103}{12}\right)^{240} - 1\right]}{\dfrac{0,103}{12}}$ $\therefore \ x = R21\ 163,87$	✓ $i = \dfrac{0,103}{12}$ and $n = 240$ ✓ substitution into the correct formula ✓ answer (3) **OR/*OF*** ✓ $i = \dfrac{0,103}{12}$ and $n = 240$ ✓ substitution into the correct formula ✓ answer (3)

7.3.4	Interest/*Rente* = R21 163,87 $\times$ 240 $-$R2 148 656,33 $=$ R2 930 672,47	✓ method ✓ answer (2)
		[14]

QUESTION/*VRAAG* 8

8.1	$f(x) = -\dfrac{3}{x}$ $f'(x) = \lim\limits_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ $= \lim\limits_{h \to 0} \dfrac{-\dfrac{3}{x+h} - \left(-\dfrac{3}{x}\right)}{h}$ $= \lim\limits_{h \to 0} \dfrac{-3x + 3(x+h)}{x(x+h)} \div h$ $= \lim\limits_{h \to 0} \dfrac{3h}{x^2 + xh} \times \dfrac{1}{h}$ $= \dfrac{3}{x^2}$	✓ substitution: $\dfrac{-\dfrac{3}{x+h} - \left(-\dfrac{3}{x}\right)}{h}$ ✓ expression with LCD: $\lim\limits_{h \to 0} \dfrac{-3x + 3(x+h)}{x(x+h)} \div h$ ✓ simplify: $\lim\limits_{h \to 0} \dfrac{3h}{x^2 + xh} \times \dfrac{1}{h}$ ✓ answer (4)
8.2.1	$D_x\left[(3x^3 - 2)^2\right]$ $= D_x\left[9x^6 - 12x^3 + 4\right]$ $= 54x^5 - 36x^2$	✓ expansion ✓ $54x^5$ ✓ $-36x^2$ (3)
8.2.2	$y = 2x^3 - \dfrac{4}{x} + 4\sqrt[3]{x}$ $y = 2x^3 - 4x^{-1} + 4x^{\frac{1}{3}}$ $\dfrac{dy}{dx} = 6x^2 + 4x^{-2} + \dfrac{4}{3}x^{-\frac{2}{3}}$	✓ $4x^{\frac{1}{3}}$ ✓ $6x^2$ ✓ $+4x^{-2}$ ✓ $+\dfrac{4}{3}x^{-\frac{2}{3}}$ (4)

| 8.3 | $y = -2x + \dfrac{4}{3}$

 $\therefore \quad m = -2$

 Gradient of tangent/*Gradiënt van raaklyn*:

 $f'(x) = \dfrac{1}{2}$

 $y = 2(1-x)^2 = 2x^2 - 4x + 2$

 $4x - 4 = \dfrac{1}{2}$

 $\therefore \quad x = \dfrac{9}{8}$

 $\therefore \quad y = \dfrac{1}{32}$

 Coordinates/*Koördinate*: $\left(\dfrac{9}{8}; \dfrac{1}{32}\right)$ | ✓ gradient of tangent:
 $f'(x) = \dfrac{1}{2}$

 ✓ $4x - 4 = \dfrac{1}{2}$

 ✓ x value

 ✓ coordinates: $\left(\dfrac{9}{8}; \dfrac{1}{32}\right)$

 (4) |
| | | **[15]** |

QUESTION/*VRAAG* 9

9.1	$y = a(x - 1)^2(x - 3)$ $6 = a(0 - 1)^2(0 - 3)$ $6 = -3a$ $\therefore\ a = -2$ $y = -2(x - 1)^2(x - 3)$ $y = -2(x^2 - 2x + 1)(x - 3)$ $y = -2(x^3 - 5x^2 + 7x - 3)$ $y = -2x^3 + 10x^2 - 14x + 6$ $\therefore\ a = -2;\ b = 10;\ c = -14$ and/*en* $d = 6$	✓ subst. $x_1 = 1$ and/*en* $x_2 = 3$ ✓ subst. $A(0;6)$ ✓ $-3a = 6$ ✓ $y = -2(x-1)^2(x-3)$ ✓ $y = -2(x^3 - 5x^2 + 7x - 3)$ (5)
9.2	$y = -2x^3 + 10x^2 - 14x + 6$ $f'(x) = -6x^2 + 20x - 14$ $f''(x) = -12x + 20$ $\quad 0 = -12x + 20$ $\therefore\ x = \dfrac{20}{12} = \dfrac{5}{3}$	✓ $f'(x) = -6x^2 + 20x - 14$ ✓ $f''(x) = 0$ ✓ answer (3)
9.3.1	$f'(x) = -6x^2 + 20x - 14$ $\quad 0 = -6x^2 + 20x - 14$ $\quad 0 = 3x^2 - 10x + 7$ $\quad 0 = (x - 1)(3x - 7)$ $\quad x = 1 \quad$ or $\quad x = \dfrac{7}{3}$ $\quad 1 < x < \dfrac{7}{3}$ Accept/*Aanvaar*: $1 \le x \le \dfrac{7}{3}$	✓ $f'(x) = 0$ ✓ factors ✓ both x values ✓✓ answer (**combo mark**) (5)
9.3.2	Turning point/*Draaipunt* $C\left(\dfrac{7}{3}; \dfrac{64}{27}\right)$ $\therefore\ 0 < k < \dfrac{64}{27}$	✓ $C\left(\dfrac{7}{3}; \dfrac{64}{27}\right)$ ✓✓ answer (**combo mark**) (3)
		[16]

QUESTION/*VRAAG* 10

10.1	Length/*Lengte* 2BC = 100-3x $$\text{Length/}\textit{Lengte} \ BC = \frac{100 - 3x}{2}$$ $$= 50 - \frac{3}{2}x$$ Area/*Oppervlakte* = AB.BC $$A(x) = x\left(50 - \frac{3}{2}x\right)$$ $$= 50x - \frac{3}{2}x^2$$	✓ $2BC = 100 - 3x$ ✓ Substitution in the area formula. (2)
10.2	$$A'(x) = 50 - 3x$$ $$0 = 50 - 3x$$ $$\therefore \quad x = \frac{50}{3}\,m$$ $$AB = \frac{50}{3}\,m$$	✓ $A'(x) = 50 - 3x$ ✓ $A'(x) = 0$ ✓ $x = \frac{50}{3}$ (3)
		[5]

QUESTION/*VRAAG* 11

11.1.1	P(female and green eyes)/*vrou met groen oë* $= \dfrac{147}{540} = \dfrac{49}{180} = 0,27$	✓ answer (1)
11.1.2	For independent events/*Vir onafhanklike gebeure*: P(female and green eyes/*vroulik en groen oë*) = P(female/*vroulik*) x P(green eyes/*groen oë*) P(female and green eyes/*vroulik en groen oë*) = 0,27 P(female/*vrou/lik*) x P(green eyes/*groen oë*) = $\dfrac{240}{540} \times \dfrac{330}{540} = \dfrac{22}{81} = 0,27$ ∴ The events are independent, and the learner is correct/*Die gebeure is onafhanklik, en die leerder is reg.* **OR/*OF*** For independent events/*Vir onafhanklike gebeure*: P(male and green eyes/*manlik en groen oë*) = P(male/*manlik*) x P(green eyes/*groen oë*) P(male and green eyes/*manlik en groen oë*)) $= \dfrac{183}{540} = \dfrac{61}{180} = 0,34$ P(male/*manlik*)) x P(green eyes/*groen oë*) $= \dfrac{300}{540} \times \dfrac{330}{540} = \dfrac{55}{162} = 0,34$ ∴ The events are independent, and the learner is correct/*Die gebeure is onafhanklik, en die leerder is reg.*	✓ rule for independent events ✓ P(female and green eyes) = 0,27 ✓ $\dfrac{240}{540} \times \dfrac{330}{540} = \dfrac{22}{81} = 0,27$ ✓ conclusion (4) **OR/*OF*** ✓ rule for independent events ✓ P(male and green eyes) = 0,34 ✓ $= \dfrac{300}{540} \times \dfrac{330}{540} = \dfrac{55}{162} = 0,34$ ✓ conclusion (4)
11.2	$P(E \text{ and } / \text{ en } F) = P(E) \times P(F)$ $\dfrac{1}{3} = x \times y$ $xy = \dfrac{1}{3}$ $P(E \text{ or } / \text{ of } F) = P(E) + P(F) - P(E \text{ and } / \text{ en } F)$ $\dfrac{9}{10} = x + y - \dfrac{1}{3}$ $\dfrac{9}{10} = \dfrac{1}{3y} + y - \dfrac{1}{3}$ $27y = 10 + 30y^2 - 10y$ $37y = 30y^2 + 10$	✓ $xy = \dfrac{1}{3}$ ✓ $\dfrac{9}{10} = x + y - \dfrac{1}{3}$ ✓ $\dfrac{9}{10} = \dfrac{1}{3y} + y - \dfrac{1}{3}$ (3)
11.3.1	$13! = 6227020800$	✓✓ answer (2)
11.3.2	$7! \times 5! \times 1! = 604\,800$	✓ 7! ✓ 5!

		✓ 1!
		✓ 604 800
		(4)
		[14]

TOTAL/*TOTAAL*: 150