**NATIONAL
SENIOR CERTIFICATE**

GRADE 12/*GRAAD* 12

MATHEMATICS P1/*WISKUNDE V1*

MARCH 2017

MEMORANDUM

MARKS: 150
PUNTE: 150

This memorandum consists of 18 pages.
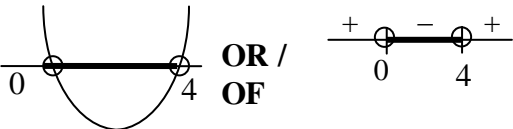*Hierdie memorandum bestaan uit 18 bladsye.*

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 memorandum van toepassing.*

QUESTION/*VRAAG* 1

1.1.1	$(x-3)(x+1) = 0$ $x = 3$ or $x = -1$	✓ answer ✓ answer (2)
1.1.2	$\sqrt{x^3} = 512$ $x^{\frac{3}{2}} = 512$ $\left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = \left(8^3\right)^{\frac{2}{3}}$ $x = 64$ **OR** $\sqrt{x^3} = 512$ $x^3 = 262144$ $x^3 = 2^{18}$ $x = 2^6$ $x = 64$	✓ $x^{\frac{3}{2}}$ ✓ $\left(8^3\right)^{\frac{2}{3}}$ ✓ answer (3) ✓ squaring both sides ✓ $x^3 = 2^{18}$ ✓ answer (3)
1.1.3	$x(x-4) < 0$ $0 < x < 4$ **OR/OF** $x \in (0; 4)$	✓ critical values ✓ inequality or interval (2)

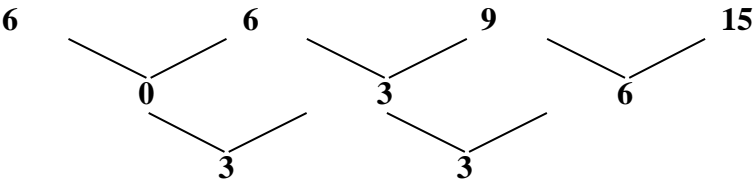| 1.2.1 | $x^2 - 5x + 2 = 0$

 $x = \dfrac{5 \pm \sqrt{(-5)^2 - 4(1)(2)}}{2(1)}$

 $x = \dfrac{5 \pm \sqrt{17}}{2}$

 $x = 0{,}44$ or $x = 4{,}56$

 OR

 $x^2 - 5x + 2 = 0$
 $x^2 - 5x = -2$
 $x^2 - 5x + \left(-\dfrac{5}{2}\right)^2 = -2 + \left(-\dfrac{5}{4}\right)^2$

 $\left(x - \dfrac{5}{2}\right)^2 = \dfrac{17}{4}$

 $x = \dfrac{5 + \sqrt{17}}{2}$ or $x = \dfrac{5 - \sqrt{17}}{2}$
 $x = 0{,}44$ or $x = 4{,}56$ | ✓ subst correct formula

 ✓ answer
 ✓ answer

 (3)

 ✓ $\left(x - \dfrac{5}{2}\right)^2 = \dfrac{17}{4}$

 ✓ answer
 ✓ answer

 (3) |
| 1.2.2 | $f(x) = x^2 - 5x + 2$
 $x^2 - 5x + 2 = c$
 $x^2 - 5x + 2 - c = 0$
 $b^2 - 4ac < 0$
 $(-5)^2 - 4(1)(2 - c) < 0$
 $25 - 8 + 4c < 0$
 $4c < -17$

 $c < -\dfrac{17}{4}$ | ✓ standard form
 ✓ $b^2 - 4ac < 0$

 ✓ substitution

 ✓ answer

 (4) |
| 1.3 | $x = 2y + 2$
 $x^2 - 2xy + 3y^2 = 4$
 $(2y + 2)^2 - 2y(2y + 2) + 3y^2 = 4$
 $4y^2 + 8y + 4 - 4y^2 - 4y + 3y^2 = 4$
 $3y^2 + 4y = 0$
 $y(3y + 4) = 0$

 $y = 0$ or $y = -\dfrac{4}{3}$

 $x = 2 \qquad x = -\dfrac{2}{3}$ | ✓ substitution
 ✓ simplification

 ✓ standard form
 ✓ factors

 ✓ $y = 0$; $y = -\dfrac{4}{3}$

 ✓ x-values (ca on both x-values)

 (6) |

	OR / OF $x = 2y + 2$ $y = \dfrac{1}{2}x - 1$ $x^2 - 2xy + 3y^2 = 4$ $x^2 - 2x\left(\dfrac{1}{2}x - 1\right) + 3\left(\dfrac{1}{2}x - 1\right)^2 = 4$ $x^2 - x^2 + 2x + 3\left(\dfrac{1}{4}x^2 - x + 1\right) = 4$ $2x + \dfrac{3}{4}x^2 - 3x + 3 = 4$ $3x^2 - 4x - 4 = 0$ $(3x + 2)(x - 2) = 0$ $x = 2 \quad$ or $\quad x = -\dfrac{2}{3}$ $y = 0 \qquad\qquad y = -\dfrac{4}{3}$	✓ substitution ✓ simplification ✓ standard form ✓ factors ✓ $x = 2$; $x = -\dfrac{2}{3}$ ✓ y-values (ca on both y-values) (6)
1.4	$S = \dfrac{6}{x^2 + 2}$ For S to be a maximum the denominator needs to be at a minimum. *Vir* S *om 'n maksimum waarde te hê, moet die deler 'n minimum waarde h* Minimum of $x^2 + 2$ is 2 $\text{Maximum of } S = \dfrac{6}{x^2 + 2}$ $\qquad\qquad\quad = \dfrac{6}{2}$ $\qquad\qquad\quad = 3$	✓ Minimum of $x^2 + 2$ is 2 ✓3 (2)
		[22]

QUESTION/*VRAAG* 2

2.1	For geometric:
	
	$$-\frac{1}{4}\ ;\ b\ ;-1;\ ......$$
	
	$$\frac{b}{-\frac{1}{4}}=-\frac{1}{b}$$
	
	$$b^2=\frac{1}{4}$$
	
	$$b=\pm\frac{1}{2}$$
	
	OR
	
	$$b=\pm\sqrt{\left(-\frac{1}{4}\right)(-1)}$$
	
	$$b=\pm\frac{1}{2}$$
		$\checkmark\ \dfrac{b}{-\frac{1}{4}}=-\dfrac{1}{b}$
		
		$\checkmark\ b=\dfrac{1}{2}$
		
		$\checkmark\ b=-\dfrac{1}{2}$
		
		                 (3)
		
		$\checkmark\ b=\pm\sqrt{\left(-\frac{1}{4}\right)(-1)}$
		
		$\checkmark\ b=\dfrac{1}{2}$
		
		$\checkmark\ b=-\dfrac{1}{2}$
		
		                 (3)

2.2	$$-\frac{1}{4};\frac{1}{2};-1;\ ......$$
	$$r=-2$$
	$$T_{19}=ar^{18}$$
	$$=\left(-\frac{1}{4}\right)(-2)^{18}$$
	$$=\left(-\frac{2^{18}}{2^2}\right)$$
	$$=-2^{16}$$
	$$=-65536$$
	OR / OF
	$$T_{19}=ar^{18}$$
	$$=\left(-\frac{1}{4}\right)(-2)^{18}$$
	$$=\left(-2^{-2}\right)\left(2^{18}\right)$$
	$$=-2^{16}$$
	$$=-65536$$
		$\checkmark r=-2$
		
		$\checkmark$ subst. into correct formula
		
		$\checkmark-65536\ /-2^{16}$
		                 (3)
		
		$\checkmark r=-2$
		$\checkmark$ subst. into correct formula
		
		$\checkmark-65536\ /-2^{16}$
		                 (3)

2.3	The series is: $-\dfrac{1}{4}\,;\dfrac{1}{2}\,;-1\,;2\,;-4\,;8\,;........$ The new positive term series: $\dfrac{1}{2}\,;\,2\,;\,8\,;\,32\,;\,128\,;$ .... $a=\dfrac{1}{2}\qquad r=4$ $\displaystyle\sum_{n=1}^{20}\left(\dfrac{1}{2}\right)(4)^{n-1}$ **OR/*OF*** $\displaystyle\sum_{p=0}^{19}\left(\dfrac{1}{2}\right)(4)^{p}$ **etc.**	$\checkmark a=\dfrac{1}{2}$ $\checkmark r=4$ $\checkmark\displaystyle\sum_{n=1}^{20}$ or $\displaystyle\sum_{p=0}^{19}$ $\checkmark$ correct formula (4)
2.4	No, the series is not convergent / *Nee, die reeks konvergeer nie* $r=4$ and for convergence $-1<r<1$ $r=4$ *en vir konvergering* $-1<r<1$	$\checkmark$no $\checkmark$reason (2)
		[12]

QUESTION/*VRAAG* 3
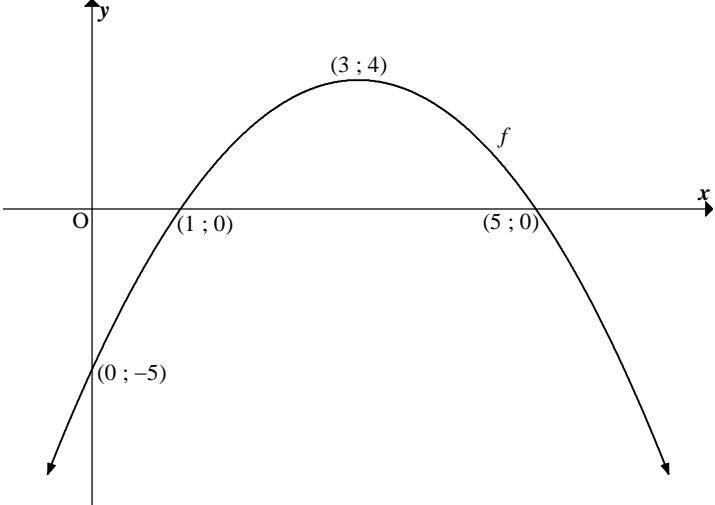
3.1.1	24	$\checkmark$ 24 (1)
3.1.2	$2a = 3 \qquad 3a + b = 0 \qquad a + b + c = 6$ $a = \dfrac{3}{2} \qquad\qquad b = -\dfrac{9}{2} \qquad\qquad c = 9$ $T_n = \dfrac{3}{2}n^2 - \dfrac{9}{2}n + 9$ **OR/OF** $T_n = T_1 + (n-1)d_1 + \dfrac{(n-1)(n-2)d_2}{2}$ $\qquad = 6 + (n-1)(0) + \dfrac{(n-1)(n-2)(3)}{2}$ $\qquad = 6 + \dfrac{n^2 - 3n + 2}{1}\left(\dfrac{3}{2}\right)$ $\qquad = 6 + \dfrac{3}{2}n^2 - \dfrac{9}{2}n + 3$ $\qquad = \dfrac{3}{2}n^2 - \dfrac{9}{2}n + 9$	$\checkmark$ $a = \dfrac{3}{2}$ $\checkmark$ $b = -\dfrac{9}{2}$ $\checkmark$ $c = 9$ $\checkmark$ $T_n = \dfrac{3}{2}n^2 - \dfrac{9}{2}n + 9$ (4) $\checkmark$formula $\checkmark$substitution $\checkmark$simplifying $\checkmark$ $T_n = \dfrac{3}{2}n^2 - \dfrac{9}{2}n + 9$ (4)
3.1.3	$\dfrac{3}{2}n^2 - \dfrac{9}{2}n + 9 = 3249$ $3n^2 - 9n + 18 = 6498$ $3n^2 - 9n - 6480 = 0$ $n^2 - 3n - 2160 = 0$ $(n + 45)(n - 48) = 0$ $n \neq -45 \qquad or \qquad n = 48$	$\checkmark$ equating general term to 3249 $\checkmark$ standard form $\checkmark$ factors $\checkmark$ $n \neq -45$ or $n = 48$ (4)
3.2	$\qquad\qquad -1 \,;\, 2\sin 3x \,;\, 5 \,;\, ...$ $2\sin 3x + 1 = 5 - 2\sin 3x$ $\qquad 4\sin 3x = 4$ $\qquad\ \ \sin 3x = 1$ $\qquad\qquad 3x = 90°$ $\qquad\qquad\ \ x = 30°$	$\checkmark$ $2\sin 3x + 1 = 5 - 2\sin 3x$ $\checkmark$ $\sin 3x = 1$ $\checkmark$ $3x = 90°$ $\checkmark$ $x = 30°$ (4) **[13]**

QUESTION/*VRAAG* 4

4.1	$U(1;0)$	✓ $(1;0)$ (1)
4.2	$x = 1$ $y = 1$	✓ $x = 1$ ✓ $y = 1$ (2)
4.3	$\dfrac{2}{x-1} + 1 = 0$ $2 = -x + 1$ $x = -1$ $T(-1;0)$	✓ $y = 0$ ✓ $x = -1$ (2)
4.4	$f(x) = \log_5 x$ $\quad h: \ x = \log_5 y$ $y = 5^x$	✓ change x and y ✓ $y = 5^x$ (2)
4.5	$y = 0$	✓ answer (1)
4.6	$V\left(\sqrt{2}+1 ; \sqrt{2}+1\right)$ $V(2,41 ; 2,41)$ **OR / OF** $\qquad x = \dfrac{2}{x-1} + 1$ $\qquad x^2 - x = 2 + x - 1$ $x^2 - 2x - 1 = 0$ $\qquad x = \dfrac{2 \pm \sqrt{4 - 4(1)(-1)}}{2}$ $\qquad = \dfrac{2 \pm \sqrt{8}}{2}$ $\qquad = \dfrac{2 \pm 2\sqrt{2}}{2}$ $\qquad = 1 \pm \sqrt{2}$ $\qquad V\left(1 + \sqrt{2}\ ; 1 + \sqrt{2}\right)$ **OR / OF** $\qquad x - 1 = \dfrac{2}{x-1}$ $(x-1)^2 = 2$ $x = 1 \pm \sqrt{2}$ $V\left(1 + \sqrt{2}\ ; 1 + \sqrt{2}\right)$	✓✓ $\sqrt{2}+1$ ✓✓ $\sqrt{2}+1$ (4) ✓ $x = \dfrac{2}{x-1} + 1$ ✓ subs into correct formula ✓ $x = \sqrt{2}+1$ ✓ $y = \sqrt{2}+1$ (4) ✓ $x - 1 = \dfrac{2}{x-1}$ ✓ $(x-1)^2 = 2$ ✓ $x = \sqrt{2}+1$ ✓ $y = \sqrt{2}+1$ (4)
4.7	$T'(3;2)$	✓ $x = 3$ ✓ $y = 2$ (2) **[14]**

QUESTION 5

5.1.1	C(0 ; –3)	✓ C(0 ; –3) (1)
5.1.2	$f(x) = x^2 - 2x - 3$ $(x-3)(x+1) = 0$ $x = -1$ or $x = 3$ AB $= 3 - (-1)$ AB $= 4$ units	✓ factors ✓ x-value ✓ other x-value ✓ answer (4)

5.1.3	$x = \dfrac{2}{2(1)}$ or $2x - 2 = 0$ or $x = \dfrac{-1+3}{2}$
	   $= 1$
	$y = (1)^2 - 2(1) - 3$
	   $= -4$
	   D$(1 ; -4)$
		✓ $x = 1$
		
		✓ y value (2)

5.1.4	C(0 ; –3) D(1 ; –4) Average gradient / *Gemiddelde gradiënt* $= \dfrac{-4+3}{1-0}$ or $\dfrac{-3+4}{0-1}$ $= -1$	✓ $\dfrac{-4+3}{1-0}$ or $\dfrac{-3+4}{0-1}$ ✓ -1 (2)
5.1.5	OC $=$ OB $= 3$ O$\hat{C}$B $= 45°$ isosceles right angled triangle *Gelykbenige reghoekige driehoek* **OR / OF** $\tan \beta = m_g$ $\tan \beta = 1$ $\beta = 45°$ O$\hat{B}$C $= 45°$ O$\hat{C}$B $= 45°$	✓ equal lengths ✓ 45° (2) ✓ $\tan \beta = 1$ ✓ 45° (2)
5.1.6	$-4 < k < -3$ **OR** $(-4 ; -3)$	✓ –4 ✓ –3 ✓ notation (3)
5.1.7	$f'(x) \cdot f''(x) > 0$ $(2x - 2).2 > 0$ $2x - 2 > 0$ $x > 1$	✓ $2x - 2$ ✓ 2 ✓ $x > 1$ (3)

5.2	$f(x) = a(x-1)(x-5)$ $4 = a(3-1)(3-5)$ $4 = -4a$ $a = -1$ $f(x) = -x^2 + 6x - 5$	TP ✓ $x = 3$ ✓ $y = 4$ ✓ x – intercepts ✓ y-intercept ✓ shape (5)
		[22]

QUESTION/*VRAAG* 6

6.1.1	$A = 150\,000(1-0,2)^2$ $\quad = R\,96\,000$	✓ $n = 2$ ✓ 150 000 in correct formula ✓ 96 000 (3)
6.1.2	$150\,000(1-0,2)^n = 49\,152$ $(0,8)^n = \dfrac{1024}{3125}$ $n\log(0,8) = \log\dfrac{1024}{3125}$ $\qquad n = 5$ The machine will need to be replaced at the beginning of 2020 / *Masjien moet aan die begin van 2020 vervang word*	✓ $150\,000(1-0,2)^n = 49\,152$ ✓ $n\log(0,8) = \log\dfrac{1024}{3125}$ ✓ $n = 5$ ✓ 2020 (4)
	OR / OF $150\,000(1-0,2)^n = 49\,152$ $(0,8)^n = \dfrac{1024}{3125}$ $n = \log_{0,8}\dfrac{1024}{3125}$ $\qquad n = 5$ The machine will need to be replaced at the beginning of 2020 / *Masjien moet aan die begin van 2020 vervang word*	✓ $150\,000(1-0,2)^n = 49\,152$ ✓ $n = \log_{0,8}\dfrac{1024}{3125}$ ✓ $n = 5$ ✓ 2020 (4)

6.1.3	R280 000 – R49 152 =R230 848 $230\ 848 = \dfrac{x\left[\left(1+\dfrac{0,085}{4}\right)^{20}-1\right]}{\dfrac{0,085}{4}}$ $x = R9\ 383,26$	✓ R230 848 ✓ $i = \dfrac{0,085}{4} = 0,02125$ and $n = 20$ ✓ subs into correct formula ✓ R 9 383,26 (4)
6.2	$P_v = \dfrac{x[1-(1+i)^{-n}]}{i}$ $= \dfrac{9\ 000\left[1-\left(1+\dfrac{0,11}{12}\right)^{-180}\right]}{\dfrac{0,11}{12}}$ $= R791\ 837,43$ Lerato qualifies for a loan of R 791 000 under the given conditions / *Lerato kwalifiseer vir 'n lening van* R 791 000 *gegewe die kondisies*	✓ $i = \dfrac{0,11}{12}$ ✓ $n = 180$ ✓ substitution correct formula ✓ R791 837,43 ✓ R791 000 (5) **[16]**

QUESTION/*VRAAG* 7
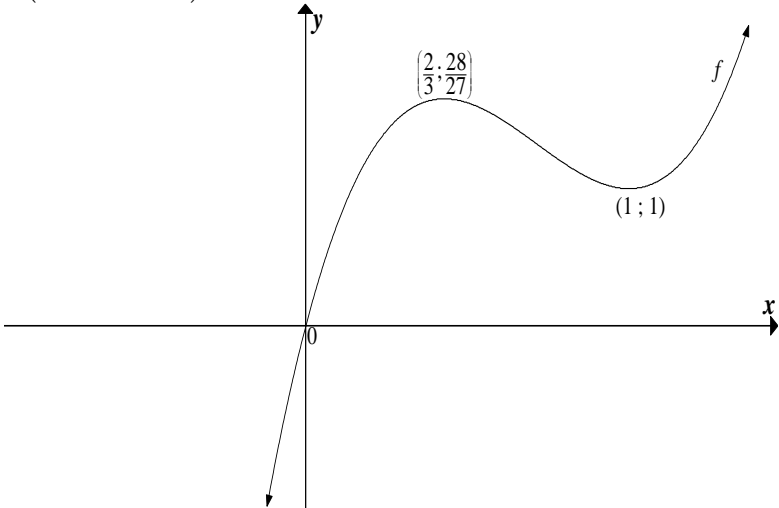
PENALISE ONLY ONCE for incorrect notation in this question.

7.1	$f(x+h) = (x+h)^2 - 5 = (x^2 + 2xh + h^2) - 5$	
	$\qquad\qquad\quad = x^2 + 2xh + h^2 - 5$	
	$f(x+h) - f(x) = x^2 + 2xh + h^2 - 5 - (x^2 - 5)$	
	$\qquad\qquad\qquad = 2xh + h^2$	✓simplifying
	$f'(x) = \lim\limits_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$	✓formula
	$\qquad = \lim\limits_{h \to 0} \dfrac{2xh + h^2}{h}$	✓subst. into formula
	$\qquad = \lim\limits_{h \to 0} \dfrac{h(2x + h)}{h}$	✓factorisation
	$\qquad = \lim\limits_{h \to 0} (2x + h)$	✓answer
	$\qquad = 2x$	(5)
	OR/OF	
	$f'(x) = \lim\limits_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$	✓formula
	$\qquad = \lim\limits_{h \to 0} \dfrac{x^2 + 2xh + h^2 - 5 - (x^2 - 5)}{h}$	✓subst. into formula
	$\qquad = \lim\limits_{h \to 0} \dfrac{2xh + h^2}{h}$	✓simplifying
	$\qquad = \lim\limits_{h \to 0} \dfrac{h(2x + h)}{h}$	✓factorisation
	$\qquad = \lim\limits_{h \to 0} (2x + h)$	✓answer
	$\qquad = 2x$	(5)
7.2	$g(x) = 5x^2 - \dfrac{2x}{x^3}$	
	$\qquad = 5x^2 - 2x^{-2}$	✓ $5x^2 - 2x^{-2}$
	$g'(x) = 10x + 4x^{-3}$	✓ $10x$
	$\qquad = 10x + \dfrac{4}{x^3}$	✓ $4x^{-3}$ or $\dfrac{4}{x^3}$
		(3)

7.3	$h(x) = ax^2$, $x > 0$	
	$h^{-1}: \ x = ay^2 \quad y > 0$	
	$y = \sqrt{\dfrac{x}{a}}$	$\checkmark \ y = \sqrt{\dfrac{x}{a}}$
	$h^{-1}(8) = \sqrt{\dfrac{8}{a}}$	$\checkmark \ \sqrt{\dfrac{8}{a}}$
	$h'(x) = 2ax$	
	$h'(4) = 2a(4)$	$\checkmark \ h'(4) = 8a$
	$\qquad = 8a$	
	$\sqrt{\dfrac{8}{a}} = 8a$	$\checkmark \ \sqrt{\dfrac{8}{a}} = 8a$
	$64a^2 = \dfrac{8}{a}$	
	$a^3 = \dfrac{1}{8}$	$\checkmark \ a^3 = \dfrac{1}{8}$
	$a = \dfrac{1}{2}$	$\checkmark \ a = \dfrac{1}{2}$
		(6)
		[14]

QUESTION/*VRAAG* 8

8.1	$f'(x) = 0$	
	$6x^2 - 10x + 4 = 0$	$\checkmark$ derivative
	$3x^2 - 5x + 2 = 0$	$\checkmark$ derivative $= 0$
	$(3x - 2)(x - 1) = 0$	$\checkmark$ factors
	$x = \dfrac{2}{3} \qquad\qquad$ or $\qquad\qquad x = 1$	$\checkmark$ x-values
	$y = 2\left(\dfrac{2}{3}\right)^3 - 5\left(\dfrac{2}{3}\right)^2 + 4\left(\dfrac{2}{3}\right) \qquad y = 2(1)^3 - 5(1)^2 + 4(1)$	
	$y = \dfrac{28}{27} \qquad\qquad$ or $\quad y = 1$	$\checkmark$ y-values
	Turning points are $\left(\dfrac{2}{3}\,;\dfrac{28}{27}\right)$ and $(1\,;1)$	
		(5)

8.2	$2x^3 - 5x^2 + 4x = 0$	
	$x(2x^2 - 5x + 4) = 0$	✓ $x(2x^2 - 5x + 4) = 0$
	$x = 0 \quad$ or $\quad x = \dfrac{5 \pm \sqrt{25 - 4(2)(4)}}{4}$	✓ $x = 0$
	$\qquad\qquad\qquad = \dfrac{5 \pm \sqrt{-7}}{4}$	✓ $\dfrac{5 \pm \sqrt{-7}}{4}$
	No real roots / *Geen reële wortels*	(3)
	OR / OF	
	$2x^3 - 5x^2 + 4x = 0$	
	$x(2x^2 - 5x + 4) = 0$	✓ $x(2x^2 - 5x + 4) = 0$
	$x = 0 \quad$ or $\quad b^2 - 4ac = 25 - 4(2)(4)$	✓ $x = 0$
	$\qquad\qquad\qquad\qquad = -7 < 0$	✓ $b^2 - 4ac < 0$
	$\qquad$ No real roots / *Geen reële wortels*	(3)
8.3	$f(x) = 2x^3 - 5x^2 + 4x$ $x(2x^2 - 5x + 4) = 0$ 	✓ $(0 ; 0)$ ✓ turning points ✓ shape (3)

8.4	$f(x) = 2x^3 - 5x^2 + 4x$	
	$f'(x) = 6x^2 - 10x + 4$	
	$f''(x) = 12x - 10$	✓ $12x - 10$
	$f''(x) > 0$	✓ $f''(x) > 0$
	$12x - 10 > 0$	
	$x > \dfrac{5}{6}$	✓ answer
		(3)
	OR	
	Point of inflection: $\qquad x = -\dfrac{b}{3a}$	
	$x = -\dfrac{(-5)}{3(2)}$	✓ $x = -\dfrac{(-5)}{3(2)}$
	$x = \dfrac{5}{6}$	✓ $x = \dfrac{5}{6}$
	The function is concave up for $x > \dfrac{5}{6}$ since $a > 0$	✓ $f''(x) > 0$
		(3)
	OR	
	Point of inflection: $\qquad x = \dfrac{\frac{2}{3} + 1}{2}$	✓ $x = \dfrac{\frac{2}{3} + 1}{2}$
	$x = \dfrac{5}{6}$	✓ $x = \dfrac{5}{6}$
	The function is concave up for $x > \dfrac{5}{6}$ since $a > 0$	✓ $f''(x) > 0$
		(3)
		[14]

QUESTION/*VRAAG* 9

| 9. | Length of one side of the square / *lengte van sy van vierkant* $= \dfrac{x}{4}$

 Length of the rectangle / *lengte van die reghoek* :

 $2l + x + \dfrac{x}{4} = 6$

 $l = \dfrac{6 - \dfrac{5x}{4}}{2}$

 $= \dfrac{24 - 5x}{8}$

 $A = \left(\dfrac{x}{4}\right)^2 + \dfrac{x}{4}\left(\dfrac{24 - 5x}{8}\right)$

 $= \dfrac{x^2}{16} + \dfrac{24x - 5x^2}{32}$

 $= \dfrac{24x - 3x^2}{32}$

 $A = \dfrac{24x - 3x^2}{32}.$

 For minimum area / *Vir* min *imum oppervlaktte* $\dfrac{dA}{dx} = 0$

 $\dfrac{dA}{dx} = \dfrac{24 - 6x}{32}$
 $6x = 24$
 $x = 4$ | ✓ $\dfrac{x}{4}$

 ✓ $\dfrac{6 - \dfrac{5x}{4}}{2}$ or $\dfrac{24 - 5x}{8}$

 ✓ $\left(\dfrac{x}{4}\right)^2$

 ✓ $\dfrac{x}{4}\left(\dfrac{24 - 5x}{8}\right)$

 ✓ $\dfrac{dA}{dx} = 0$
 ✓ $\dfrac{24 - 6x}{32}$

 ✓ $x = 4$

 (7) |
| | | **[7]** |

QUESTION/*VRAAG* 10

10.1.1	$P(S \text{ and } T) = P(S) \times P(T)$ $$\frac{1}{6} = \left(\frac{1}{4}\right) \times P(T)$$ $$P(T) = \frac{2}{3}$$	✓ $P(S \text{ and } T) = P(S) \times P(T)$ ✓ $P(T) = \frac{2}{3}$ (2)
10.1.2	$P(S \text{ or } T) = P(S) + P(T) - P(S \text{ and } T)$ $$= \left(\frac{1}{4}\right) + \left(\frac{2}{3}\right) - \frac{1}{6}$$ $$= \frac{3}{4}$$	✓ $\left(\frac{1}{4}\right) + \left(\frac{2}{3}\right) - \frac{1}{6}$ ✓ $\frac{3}{4}$ (2)
10.2.1	$5!$ $= 120$	✓ 5 ✓ 5! or 120 (2)
10.2.2	5^5 $= 3125$	✓ 5^5 or 3 125 (1)
10.3	$n(E) = 5! \times 2! \times 2!$ $n(S) = 7!$ $$P(E) = \frac{5! \times 2! \times 2!}{7!}$$ $$= \frac{2}{21}$$	✓ 5! ✓ $2! \times 2!$ ✓ $\frac{5! \times 2! \times 2!}{7!}$ ✓ $\frac{2}{21}$ (4)
		[11]

QUESTION/*VRAAG* 11

11		
	0,85 W P(F and W) = 0,595 F 0,7 0,15 L P(F and L) = 0,105 0,55 W P(not F and W) = 0,165 0,3 not F 0,45 L P(not F and L) = 0135	✓ 0,3

	P(Win) = P(F and W) + P(not F and W)
	
	 $= 0,7 \times 0,85 + 0,3 \times 0,45$
	
	 $= 0,595 + 0,165$
	
	 $= 0,76$
	
	 $= 76\%$
	
	 $= \dfrac{19}{25}$
		✓ P(F and W) = 0,7 × 0,85
		          = 0,595
		 ✓ P(not F and W)
		   = 0,3 × 0,45
		   = 0,165
		 ✓ 0,595 + 0,165
		
		 ✓ 0,76 / 76% / $\dfrac{19}{25}$
		
		                 (5)

		[5]

TOTAL/*TOTAAL*:   150