GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

AMENDMENT TO MARKING GUIDELINES

PREPARATORY EXAMINATION / *VOORBEREIDENDE EKSAMEN* 2023

FOR ATTENTION / *VIR AANDAG*: THE CHIEF INVIGILATOR / *DIE HOOF TOESIGHOUER*

SUBJECT / *VAK*	**MATHEMATICS / *WISKUNDE***
SUBJECT CODE / *VAKKODE*	**10611**
PAPER / *VRAESTEL*	**1**
DATE OF EXAMINATION / *DATUM VAN EKSAMEN*	**8 SEPTEMBER 2023**

The **MATHEMATICS / *WISKUNDE* (Paper / *Vraestel* 1)** written on **8 September 2023** has reference. It has come to our attention that there was an anomaly in the question paper which rendered **Question / *Vraag* 9.2** ambiguous.

To ensure that your candidates are not disadvantaged and prejudiced in way, you are advised to please ask Educators to ignore **Question / *Vraag* 9.2** when **marking.**

In other words, the paper must be marked out of a total of 145 instead of 150 and then the learners' marks must be converted back to a mark out of 150. E.g. Should a learner have attained 65/145, then that mark is recalculated as 67/150.

Use the formula: $\frac{a}{145} \times 100 = b$. *Then,* $\frac{b}{100} \times 150 = c$

c *is the mark that is entered into SASAMS* ***out of 150****.*

Mr. Jonathan Williams

DIRECTOR: EXAMINATIONS MANAGEMENT
9 September 2023

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PREPARATORY EXAMINATION

2023

MARKING GUIDELINES

MATHEMATICS (PAPER 1) (10611)

21 pages

INSTRUCTIONS AND INFORMATION:

A – Accuracy

CA – Continued Accuracy

S – Statement

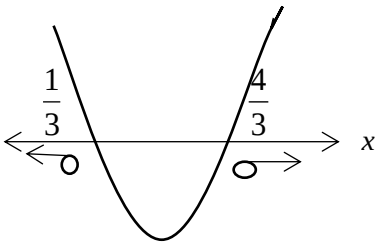
R – Reason

S and R – Statement and Reason

NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed OUT an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- It is UNACCEPTABLE to assume values/answers in order to solve a question.

QUESTION 1

1.1	1.1.1	$(2x+1)^2-4=0$ $4x^2+4x+1-4=0$ $4x^2+4x-3=0$ $(2x+3)(2x-1)=0$ $x=-\frac{3}{2}$ *or* $x=\frac{1}{2}$ **OR** $(2x+1)^2-4=0$ $2x+1=\pm\sqrt{4}$ $2x+1=\pm 2$ $2x=\pm 2-1$ $2x=2-1$ *or* $2x=-2-1$ $2x=1$ *or* $2x=-3$ $x=\frac{1}{2}$ *or* $x=-\frac{3}{2}$ **NOTE: In option 2, the simplification mark must only be awarded if the candidate states ± 2 or demonstrates it later in the solution.**	✓ standard form ✓ factors ✓ answers ✓ find root ✓ simplification ✓ answers	(3)
	1.1.2	$4x^2-11=-12x$ $4x^2+12x-11=0$ $x=\frac{-12\pm\sqrt{(12)^2-4(4)(-11)}}{2(4)}$ $x=-3,74$ or $x=0,74$ **NOTE: Penalise 1 mark for rounding in this question only. Candidate must show the substitution to obtain full marks.**	✓ correct substitution ✓✓ answers	(3)
	1.1.3	$15x-4<9x^2$ $\therefore -9x^2+15x-4<0$ $\therefore 9x^2-15x+4>0$ $(3x-1)(3x-4)>0$ $\therefore x<\frac{1}{3}$ *or* $x>\frac{4}{3}$  **NOTE: Penalise 1 mark for use of AND instead of OR**	✓ standard form ✓ factors ✓✓ answers	(4)

	1.1.4	$\sqrt{2x-2}-\sqrt{7-2x}=1$ $(\sqrt{2x-2})^2=(\sqrt{7-2x}+1)^2$ $2x-2=7-2x+2\sqrt{7-2x}+1$ $4x-10=2\sqrt{7-2x}$ $(2x-5)^2=(\sqrt{7-2x})^2$ $4x^2-20x+25=7-2x$ $4x^2-18x+18=0$ $\therefore 2x^2-9x+9=0$ $(x-3)(2x-3)=0$ $\therefore x=3 \quad or \quad x=\frac{3}{2}$ reject : $x\neq\frac{3}{2}$	✓ isolate surd and square both sides ✓ simplification ✓ standard form ✓ factors ✓ $x=3$ and rejection	(5)
1.2		$a^2b^2-2ab-8=0 \quad$ and $\quad \log_2(a+5)=3$ $\log_2(a+5)=3$ $2^3=a+5$ $8=a+5$ $a=3$ $\therefore a^2b^2-2ab-8=0$ $(3)^2b^2-2(3)b-8=0$ $9b^2-6b-8=0$ $(3b-4)(3b+2)=0$ $b=\frac{4}{3}$ or $b=-\frac{2}{3}$ **OR** $a^2b^2-2ab-8=0 \quad$ and $\quad \log_2(a+5)=3$ $\log_2(a+5)=3$ $2^3=a+5$ $8=a+5$ $a=3$ $a^2b^2-2ab-8=0$ $(ab-4)(ab+2)=0$ $ab=4 \quad$ or $\quad ab=-2$ $\therefore 3b=4 \qquad 3b=-2$ $b=\frac{4}{3}$ or $b=-\frac{2}{3}$	✓ exponential form ✓ value of a ✓ substitution ✓ factors ✓ both answers for b **OR** ✓ exponential form ✓ value of a ✓ factors ✓ substitution ✓ both answers for b	(5)

1.3	$p = \dfrac{\sqrt{x+2}}{\sqrt{16-x^2}}$ $\therefore x+2 \geq 0$ $\therefore x \geq -2 \cdots\cdots\cdots (1)$ $\therefore 16-x^2 > 0$ $(4+x)(4-x) > 0$ $\therefore -4 < x < 4 \cdots\cdots\cdots (2)$ From (1) and (2) $-2 \leq x < 4$	✓ inequality (1) ✓ factors ✓ inequality (2) ✓ answer	(4)
			[24]

QUESTION 2

2.1	2.1.1		$1-p;\ \ 2p-3;\ \ p+5$ $d = T_2 - T_1 = T_3 - T_2$ $\therefore (2p-3)-(1-p) = (p+5)-(2p-3)$ $2p-3-1+p = p+5-2p+3$ $3p-4 = -p+8$ $4p = 12$ $\therefore p = 3$	✓ substitution ✓ answer	(2)
	2.1.2	(a)	$T_1 = 1-p$ $T_1 = 1-3$ $T_1 = -2$	✓ answer	(1)
		(b)	$T_2 = 2p-3$ $T_2 = 2(3)-3$ $\therefore T_2 = 3$ $\therefore d = T_2 - T_1$ $d = 3-(-2)$ $d = 5$	✓ answer	(1)
	2.1.3		$1-p;\quad 2p-3;\quad p+5;...$ $= 1-3;\quad 2(3)-3;\quad 3+5;...$ $= -2;\ 3;\ 8;\ 13;\ 18;...$ All the terms except T_1 end in either 3 or 8 while perfect squares end on 1; 4; 9; 6; 5; 0. **OR**	✓ correct terms ✓ explanation	

		T_1 is not a perfect square. **OR** $Tn = 5n - 7$ $\therefore$ not a perfect square	✓✓ explanation ✓✓ $Tn = 5n - 7$	(2)

2.2	2.2.1	$-3;\ -2;\ -3;\ -6;\ -11;\ldots$ First differences: $+1;\ -1;\ -3;\ -5$ $T_n = a+(n-1)d$ $T_n = 1+(n-1)(-2)$ $T_n = 1-2n+2$ $T_n = -2n+3$	✓ first differences ✓ substitution ✓ answer	(3)
	2.2.2	$T_n = -2n+3$ $T_{35} = -2(35)+3$ $\therefore T_{35} = -67$	✓ answer	(1)
	2.2.3	-3 -2 -3 -6 -11 1 -1 -3 -5 1st differences -2 -2 -2 2nd differences $2a=-2$ $3a+b=1$ $a+b+c=-3$ $a=-1$ $3(-1)+b=1$ $-1+4+c=-3$ $b=4$ $c=-6$ $Tn=-n^2+4n-6$ **OR** $T_n = an^2+bn+c$ $but\cdots 2a=-2$ $\therefore a=-1$ $\therefore T_n = -n^2+bn+c$ $T_1 = -(1)^2+b(1)+c$ $-3=-1+b+c$ $\therefore -2=b+c\cdots\cdots(1)$ $T_2 = -(2)^2+b(2)+c$ $-2=-4+2b+c$ $\therefore 2=2b+c\cdots\cdots(2)$ $(2-1)\cdots\therefore b=4$ $sub(1)\cdots -2=4+c$ $\therefore c=-6$ $\therefore T_n = -n^2+4n-6$	✓ second differences ✓ $a=-1$ ✓ $b=4$ ✓ $c=-6$ ✓ second differences ✓ $a=-1$ ✓ $b=4$ ✓ $c=-6$	(4)

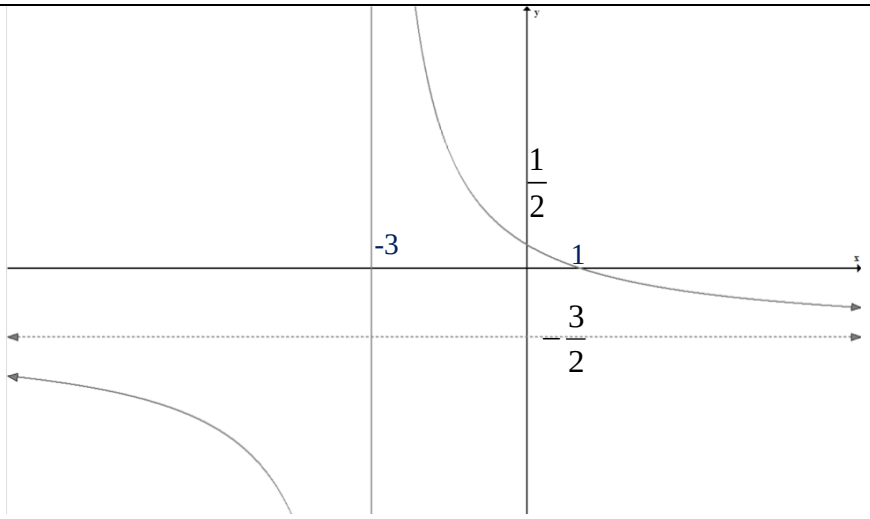
	2.2.4	$T_n = -n^2 + 4n - 6$ $T'(n) = -2n + 4$ $0 = -2n + 4$ $n = 2$ $\therefore T(2) = -2$ $\therefore$ NO positive terms. **OR** $T_n = -n^2 + 4n - 6$ $T_n = -[n^2 - 4n + 2^2 - 4 + 6]$ $T_n = -[(n-2)^2 + 2]$ $\therefore T_n = -(n-2)^2 - 2$ $\therefore T_n(\max) = -2$ $\therefore$ NO positive terms. **OR** Max is given as -2 and is negative	✓ method ✓ $T_n(\max)$ ✓ method ✓ $T_n(\max)$ ✓✓ Max = -2	(2)
				[16]

QUESTION 3

3.1	$S_n = 4n^2 + 1$ $S_6 = 4(6)^2 + 1$ $\therefore S_6 = 145$ $S_5 = 4(5)^2 + 1$ $\therefore S_5 = 101$ $\therefore T_6 = S_6 - S_5$ $\therefore T_6 = 145 - 101$ $\therefore T_6 = 44$	✓ value of S_6 ✓ value of S_5 ✓ answer	(3)
3.2	$(4x-3) + (4x-3)^2 + (4x-3)^3$ $\therefore r = 4x - 3$ $\therefore -1 < r < 1; \quad r \neq 0$ $-1 < 4x - 3 < 1; \quad 4x - 3 \neq 0$ $\therefore 2 < 4x < 4 \quad x \neq \frac{3}{4}$ $\therefore \frac{1}{2} < x < 1; \quad x \neq \frac{3}{4}$ **NOTE: No penalty if candidate does not state: $x \neq \frac{3}{4}$**	✓ $r = 4x - 3$ ✓ $-1 < r < 1$ ✓ answer	(3)
3.3	$\sum_{k=3}^{5} (-1)^k . \frac{2}{k}$ $= (-1)^3 . \frac{2}{3} + (-1)^4 . \frac{2}{4} + (-1)^5 . \frac{2}{5}$ $= -\frac{2}{3} + \frac{1}{2} - \frac{2}{5}$ $= -\frac{17}{30}$ **NOTE: Answer only, full marks.**	✓ expansion ✓ answer	(2)
			[8]

QUESTION 4

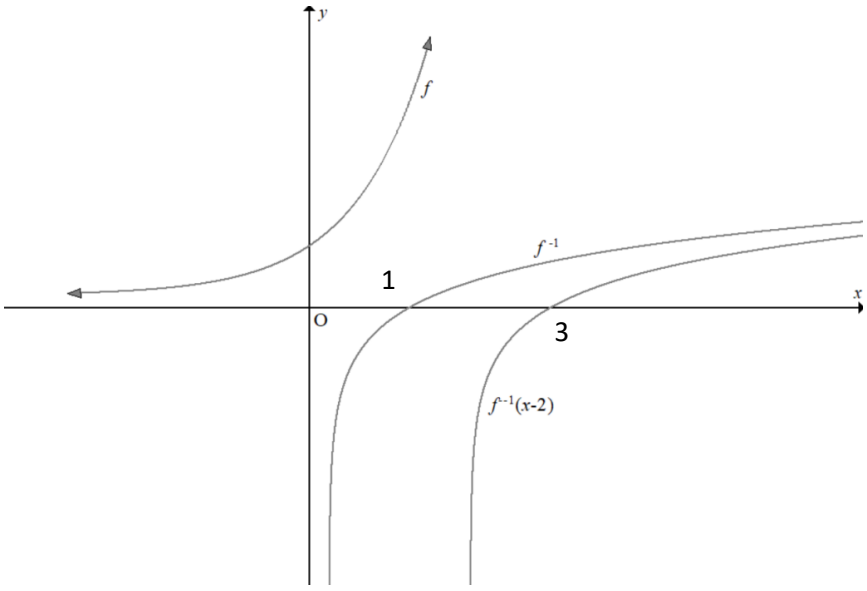
4.1	$x \neq -3$		✓ answer	(1)
4.2	$y \neq 2$		✓ answer	(1)
4.3	4.3.1	6 units **NOTE: Accept 6 units right, but not 6 units left.**	✓ answer	(1)
	4.3.2	3,5 units **NOTE: Accept 3,5 units upwards, but not 3,5 units downwards.**	✓ answer	(1)
4.4	$x = -3$ $y = -\frac{3}{2}$ **NOTE: Do not accept any equating in terms of *p* and *q*.**		✓ answer ✓ answer	(2)
4.5	$0 = \frac{6}{x+3} - 1,5$ $\frac{3}{2} = \frac{6}{x+3}$ $3(x+3) = 6(2)$ $3x + 9 = 12$ $3x = 3$ $x = 1$ $(1;0)$ **NOTE: The answer does NOT need to be given in coordinate form.**		✓ answer	(1)

4.6		✓ asymptotes ✓ intercepts ✓ shape	(3)
4.7	$y = -x + k$ $\therefore -\frac{3}{2} = -(-3) + k$ $-\frac{3}{2} = 3 + k$ $\therefore k = -\frac{9}{2}$ **NOTE: Award FULL marks for Answer only**	✓ substitute point ✓ answer	(2)
4.8	$x > -3$	✓ answer	(1)
4.9	$y = \frac{-6}{x+3} + \frac{3}{2}$ **OR** $y = \frac{6}{-x-3} + \frac{3}{2}$ **OR** $y = -\frac{6}{x+3} + \frac{3}{2}$	✓ answer	(1)
			[14]

QUESTION 5

5.1	$\mathrm{E}\left(\frac{7}{2};\frac{81}{4}\right)$	✓ answer	(1)
5.2	$f(x)=-\left(x-\frac{7}{2}\right)^2+\frac{81}{4}$ $f(1)=-\left(1-\frac{7}{2}\right)^2+\frac{81}{4}=14$ $f(5)=-\left(5-\frac{7}{2}\right)^2+\frac{81}{4}=18$ $\therefore AG=\frac{f(5)-f(1)}{5-1}$ $=\frac{18-14}{4}$ $\therefore AG=1$	✓ value of $f(1)$ ✓ value of $f(5)$ ✓ substitution ✓ answer	(4)
5.3	$f(x)=-(x-\frac{7}{2})^2+\frac{81}{4}$ $\therefore f(x)=-x^2+7x+8$ $\because f(x)=g(x)$ $\therefore -x^2+7x+8=-3x+24$ $-x^2+10x-16=0$ $\therefore x^2-10x+16=0$ $(x-2)(x-8)=0$ $\therefore x=2 \quad or \quad x=8$ $\therefore x_D=2$	✓ equating ✓ x-values ✓ answers/selection	(3)
5.4	$ST=f(x)-g(x)$ $ST=-x^2+7x+8-(-3x+24)$ $ST=-x^2+7x+8+3x-24$ $ST=-x^2+10x-16$	✓ method ✓ answer	(2)
5.5	For max: $\frac{d(ST)}{dx}=0$ $\frac{d(ST)}{dx}=-2x+10=0$ $2x=10$ $\therefore x=5$ max: $ST=-(5)^2+10(5)-16$ $\therefore ST=9$	✓ derivative = 0 ✓ value for x ✓ answer	(3)
			[13]

QUESTION 6

6.1	$y = 3^x$ Inverse $x = 3^y$ $\therefore y = \log_3 x$	✓ answer	(1)
6.2	$y = f^{-1}(x) = \log_3 x$ *x*-intercept: $\log_3 x = 0$ $\therefore x = 3^0$ $\therefore x = 1$ *y*-intercept: None $y = f^{-1}(x-2) = \log_3(x-2)$ *x*-intercept: $\log_3(x-2) = 0$ $\therefore x - 2 = 3^0$ $\therefore x = 3$ *y*-intercept: None  **NOTE: If the candidate does not draw the graph but calculates both *x*-intercepts, award 2 marks.** **If the graph crosses the asymptote, DO NOT award the shape mark.**	✓ *x*-intercept of $f^{-1}(x) = \log_3 x$ ✓ shape $f^{-1}(x) = \log_3 x$ ✓ *x*-intercept of $f^{-1}(x-2) = \log_3(x-2)$ ✓ shape $f^{-1}(x-2) = \log_3(x-2)$	(4)
6.3	$\log_3(x-2) < 1$ $\therefore 2 < x < 5$	✓ critical values ✓ correct notation	(2)
			[7]

QUESTION 7

7.1	$A = P(1+i)^n$ $6\,000\,000 = 5\,700\,000(1+i)^7$ $\frac{6\,000\,000}{5\,700\,000} = (1+i)^7$ $\sqrt[7]{1{,}0526...} = 1+i$ $\therefore i = 1{,}00735 - 1$ $\therefore i = 0{,}00735$ rate: 0,74%	✓ substitution into correct formula ✓ value of i ✓ answer	(3)
7.2	7.2.1 $P_v = \frac{x[1-(1+i)^{-n}]}{i}$ $4\,000\,000 = \frac{30\,000\left[1-\left(1+\frac{0,06}{12}\right)^{-n}\right]}{\frac{0,06}{12}}$ $\frac{400\,000\times\left(\frac{0,06}{12}\right)}{30\,000} = 1-\left(1+\frac{0,06}{12}\right)^{-n}$ $\frac{1}{3} = \left(1+\frac{0,06}{12}\right)^{-n}$ $\log_{\left(1+\frac{0,06}{12}\right)}\frac{1}{3} = -n$ $n = 220,27$ $\therefore$ she will make 220 withdrawals.	✓ substitution into correct formula ✓ $i = \frac{0,06}{12}$ ✓ simplification ✓ correct use of logs ✓ answer of 220	(5)

	7.2.2	$4\,000\,000 = \dfrac{20\,000\left[1-\left(1+\dfrac{0,06}{12}\right)^{-n}\right]}{\dfrac{0,06}{12}}$ $0 = \left(1+\dfrac{0,06}{12}\right)^{-n}$ She can make any number (an infinite number) of withdrawals. Her interest earned equals her withdrawal amount. She will only be drawing the interest amount. **OR** $A = P(1+i)^n$ $A = 4\,000\,000\left(1+\dfrac{0.06}{12}\right)^1$ $A = \text{R}4\,020\,000$ She can make any number (an infinite number) of withdrawals. Her interest earned equals her withdrawal amount. She will only be drawing the interest amount.	✓ valid method ✓ simplification ✓ explanation **OR** ✓ valid method ✓ answer ✓ explanation	(3)
7.3	$A = P(1+i)^n$ $A = 1\,000(1+\dfrac{0,15}{12})^{18}$ $A = \text{R}1\,250,58$ $F_v = \dfrac{x[(1+i)^n - 1]}{i}$ $F_v = \dfrac{700[(1+\dfrac{0,15}{12})^{18} - 1]}{\dfrac{0,15}{12}}$ $F_v = \text{R}14\,032,33$ Amount = R1 250,58 + R14 032,33 ∴ Amount = R15 282,91	✓ value of A ✓ substitution in correct formula ✓ value for F_v ✓ answer	(4)
				[15]

QUESTION 8

8.1	$f(x)=3x^2-6$ $f(x+h)=3(x+h)^2-6$ $f(x+h)=3(x^2+2xh+h^2)-6$ $f(x+h)=3x^2+6xh+3h^2-6$ $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ $f'(x)=\lim_{h\to 0}\frac{3x^2+6xh+3h^2-6-3x^2+6}{h}$ $f'(x)=\lim_{h\to 0}\frac{6xh+3h^2}{h}$ $f'(x)=\lim_{h\to 0}\frac{h(6x+3h)}{h}$ $f'(x)=\lim_{h\to 0}(6x+3h)$ $f'(x)=6x$ **NOTE: Penalise 1 mark for notation error in this question only.** **Award ZERO marks for Answer only**	✓ $f(x+h)$ ✓ substitution ✓ factorisation *(may be implied)* ✓ answer	(4)
8.2	$f(x)=(2\sqrt{x}-\frac{1}{x})^2$ $f(x)=4x-4.\frac{1}{\sqrt{x}}+\frac{1}{x^2}$ $f(x)=4x-4x^{-\frac{1}{2}}+x^{-2}$ $f'(x)=4+2x^{-\frac{3}{2}}-2x^{-3}$ **OR** $f'(x)=4+\frac{2}{\sqrt{x^3}}-\frac{2}{x^3}$	✓ simplification ✓ $f(x)=4x-4x^{-\frac{1}{2}}+x^{-2}$ ✓ 4 ✓ $2x^{-\frac{3}{2}}$ or $\frac{2}{\sqrt{x^3}}$ ✓ $-2x^{-3}$ or $\frac{2}{x^3}$	(5)
8.3	$f(x)=3x^3-3x^2+6x-2$ $f'(x)=9x^2-6x+6$ $f''(x)=18x-6$ for concave up $18x-6>0$ $\therefore x>\frac{1}{3}$ $\therefore x\in\left(\frac{1}{3};\infty\right)$	✓ $f'(x)$ ✓ $f''(x)$ ✓ correct condition of concavity ✓ answer	(4)
			[13]

QUESTION 9

9.1	9.1.1	$f'(x) = -6x^2 - 6x + 12$ *y*-intercept $x = 0$ $\therefore f'(0) = 12$ $\therefore$ A(0 ; 12) **NOTE: Does not have to be in coordinate form.**	✓ answer	(1)
	9.1.2	*x*-intercepts $y = f'(x) = 0$ $-6x^2 - 6x + 12 = 0$ $\therefore x^2 + x - 2 = 0$ $(x+2)(x-1) = 0$ $\therefore x = -2 \quad or \quad x = 1$ $\therefore$ B(−2 ; 0) ; C(1 ; 0) **NOTE: Must be in coordinate form.**	✓ $f'(x)$ (= 0 may be implied) ✓ factors ✓ both coordinates	(3)
	9.1.3	Turning points	✓ answer	(1)
	9.1.4	$f(x)$ increases where: $m = f'(x) > 0$ $\therefore -2 < x < 1$ **OR** $m = f'(x) > 0$ $\therefore x \in (-2 ; 1)$	✓ $m = f'(x) > 0$ ✓✓ answers **OR** ✓ $m = f'(x) > 0$ ✓✓ answers	(3)
	9.1.5	Point of inflection: $f''(x) = 0$ $\therefore -12x - 6 = 0$ $-12x = 6$ $\therefore x = -\frac{1}{2}$ $f(x) = -2x^3 - 3x^2 + 12x + 20$ $\therefore f(-\frac{1}{2}) = -2(-\frac{1}{2})^3 - 3(-\frac{1}{2})^2 + 12(-\frac{1}{2}) + 20$ $\therefore f(-\frac{1}{2}) = 13{,}5$	✓ $f''(x) = 0$ ✓ value for *x* ✓ substitution ✓ value for $f(-\frac{1}{2})$	(4)
9.2	**DO NOT MARK THIS QUESTION. THIS QUESTION HAS BEEN REMOVED FROM THE EXAMINATION PAPER.**			
				[12]

QUESTION 10

10.	$W(x) = -\frac{x^3}{150} + 3x^2 - 250x - 2700$		
	$\therefore$ max :		
	$W'(x) = -\frac{3x^2}{150} + 6x - 250 = 0$	✓ $W'(x)$	
	$-x^2 + 300x - 12500 = 0$		
	$\therefore x^2 - 300x + 12500 = 0$	✓ equate to 0	
	$(x - 250)(x - 50) = 0$	✓ factors	
	$\therefore x = 250 \quad or \quad x = 50$	✓ values of x	
	$W''(x) = -\frac{6x}{150} + 6$	✓ $W''(x)$	
	$W''(x) = -\frac{x}{25} + 6$		
	$\therefore W''(50) = -\frac{50}{25} + 6 > 0$	✓ $W''(50) > 0$	
	$\therefore W''(250) = -\frac{250}{25} + 6 < 0$	✓ $W''(250) < 0$	
	$\therefore$ Maximum profit: 250 bicycles weekly.	✓ conclusion	
	OR		

$W(x) = -\frac{x^3}{150} + 3x^2 - 250x - 2700$

$\therefore$ max :

$W'(x) = -\frac{3x^2}{150} + 6x - 250 = 0$ ✓ $W'(x)$

$-x^2 + 300x - 12500 = 0$ ✓ equate to 0

$\therefore x^2 - 300x + 12500 = 0$ ✓ factors

$(x - 250)(x - 50) = 0$ ✓ values of x

$\therefore x = 250 \quad or \quad x = 50$

$W(250) = -\frac{250^3}{150} + 3(250)^2 - 250(250) - 2700$ ✓ substitution

$W(250) = R18133,33$ ✓ W(250)

or

$W(50) = -\frac{50^3}{150} + 3(50)^2 - 250(50) - 2700$ ✓ W(50)

$W(50) = -R8533,33$

$\therefore$ Maximum profit: 250 Bicycles weekly ✓ conclusion

OR

$W(x) = -\frac{x^3}{150} + 3x^2 - 250x - 2700$

$\therefore$ max :

$W'(x) = -\frac{3x^2}{150} + 6x - 250 = 0$ ✓ $W'(x)$

$-x^2 + 300x - 12500 = 0$ ✓ equate to 0

$\therefore x^2 - 300x + 12500 = 0$ ✓ factors

$(x - 250)(x - 50) = 0$ ✓ values of x

$\therefore x = 250 \quad or \quad x = 50$

✓ shape

✓ min at $x = 50$

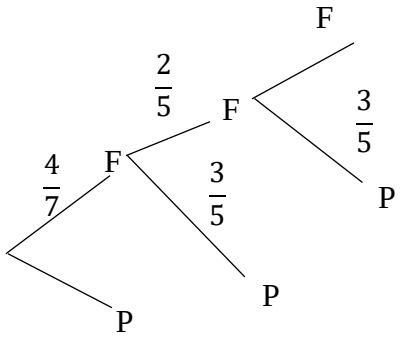
✓ max at $x = 250$

$\therefore$ Maximum profit: 250 Bicycles weekly ✓ conclusion

[8]

QUESTION 11

NOTE: Candidates can present solutions either in decimal or fraction form. Do not penalise for rounding-off.

11.1	11.1.1	For independent events: $P(A)\times P(B)=P(A \text{ and } B)$ $\therefore (x+0,1)\times(0,4)=(0,1)$ $\therefore (x+0,1)=0,25$ $\therefore x=0,15$ $x+0,1+0,3+y=1$ $0,15+0,1+0,3+y=1$ $\therefore y=0,45$	✓ correct substitution ✓ value for x ✓ method ✓ value for y	(4)
	11.1.2	$0,15+0,3$ $=0,45$ **NOTE: Answer only, full marks.**	✓ answer	(1)
11.2	 F (unsuccessful)/ P (pass/succeed)			
	11.2.1	$\frac{4}{7}\times\frac{3}{5}=\frac{12}{35}$ **NOTE: Answer only, full marks.**	✓ method ✓ answer	(2)
	11.2.2	$\frac{4}{7}\times\frac{2}{5}\times\frac{3}{5}=\frac{24}{175}$ **NOTE: Answer only, full marks.**	✓ method ✓ answer	(2)
				[9]

QUESTION 12

12.1	12.1.1	1 **NOTE: Accept 2.**	✓ answer	(1)
	12.1.2	$7!-(2!\times 6!)=3\,600$ **NOTE: Accept answer as 3 600 or 7!–(2!×6!) No CA if method is meaningless.**	✓ 7! ✓ –(2!×6!) ✓ answer	(3)
12.2	P(win) $=0,7\times 0,9+0,3\times 0,45$ $=0,765$ = 76,5% **NOTE: No CA if method is meaningless.**		method answer	(2)
				[6]
				TOTAL: 145