education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICS P1

SEPTEMBER 2024

MARKING GUIDELINES

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MARKS: 150

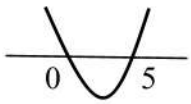
These marking guidelines consist of 18 pages and a cognitive grid of 2 pages.

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NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in ALL aspects of the marking guidelines.

QUESTION 1

1.1.1	$(2x-6)(x+5)=0$ $2x=6 \quad \text{or} \quad x=-5$ $x=3$	✓ $x=-5$ ✓ $x=3$ (2)
1.1.2	$7x^2-11x+3=0$ $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\dfrac{-(-11)\pm\sqrt{(-11)^2-4(7)(3)}}{2(7)}$ $=\dfrac{11\pm\sqrt{37}}{14}$ $x=1{,}22 \quad \text{or} \quad x=0{,}35$	✓ substitution into correct formula ✓ $x=1{,}22$ ✓ $x=0{,}35$ (3)
1.1.3	$x^2\geq 5x$ $x^2-5x\geq 0$ $x(x-5)\geq 0$ $\therefore \quad x\leq 0 \quad \text{or} \quad x\geq 5$ 	✓ standard form ✓ critical points ✓ $x\leq 0$ ✓ $x\geq 5$ (4)
1.1.4	$3\sqrt{x+12}-x=8$ $3\sqrt{x+12}=x+8$ $\left(3\sqrt{x+12}\right)^2=(x+8)^2$ $9(x+12)=x^2+16x+64$ $9x+108=x^2+16x+64$ $0=x^2+7x-44$ $0=(x+11)(x-4)$ $x=-11 \quad \text{or} \quad x=4$ *n.a.*	✓ isolate the root ✓ square both sides ✓ standard form ✓ both answers ✓ select correct answer (5)

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1.2	$2y = 5 + x$ $2y - 5 = x$	✓ $x = 2y - 5$	
	$y^2 + 3xy = 2x^2 + 50$ $y^2 + 3(2y - 5)y = 2(2y - 5)^2 + 50$	✓substitution	
	$y^2 + 6y^2 - 15y = 2(4y^2 - 20y + 25) + 50$ $= 8y^2 - 40y + 50 + 50$	✓ simplification	
	$0 = y^2 - 25y + 100$	✓ standard form	
	$0 = (y - 20)(y - 5)$ $y = 20$ or $y = 5$	✓ both y-values	
	$x = 2(20) - 5$ or $x = 2(5) - 5$ $= 35$ $= 5$	✓ both x-values	(6)
	OR		
	$y = \frac{5 + x}{2}$	✓ $y = \frac{5 + x}{2}$	
	$y^2 + 3xy = 2x^2 + 50$ $\left(\frac{5 + x}{2}\right)^2 + 3x\left(\frac{5 + x}{2}\right) = 2x^2 + 50$	✓substitution	
	$\left(\frac{25 + 10x + x^2}{4}\right) + \left(\frac{15x + 3x^2}{2}\right) = 2x^2 + 50$	✓ simplification	
	$25 + 10x + x^2 + 30x + 6x^2 = 8x^2 + 200$ $0 = x^2 - 40x + 175$	✓ standard form	
	$0 = (x - 35)(x - 5)$ $x = 35$ or $x = 5$	✓ both x-values	
	$y = \frac{5 + 35}{2}$ or $y = \frac{5 + 5}{2}$ $= 20$ $= 5$	✓ both y-values	(6)

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1.3	$\frac{\left(2^{2p-1}\right)^3}{\sqrt{7}^k}$ $= \frac{2^{6p-3}}{\left(7^{\frac{1}{2}}\right)^k}$ $= \frac{2^{6p}.2^{-3}}{\left(7^k\right)^{\frac{1}{2}}}$ $= \frac{81}{2^3(729)^{\frac{1}{2}}}$ $= \frac{81}{2^3(27)} = \frac{3^4}{2^3.3^3}$ $= \frac{3}{8}$	✓ exponential laws ✓ $\frac{81}{2^3}$ ✓ $\sqrt{7}^k = 27$ ✓ answer (4) **[24]**

QUESTION 2

2.1	$T_4 = 22$	✓ 22 (1)
2.2	$T_n = a + (n-1)d$ $= 4 + (n-1)(6)$ $= 4 + 6n - 6$ $= 6n - 2$ $T_{50} = 6(50) - 2$ $= 298$	✓ substitution ✓ answer (2)
2.3.1	$P_k = \sum_{n=0}^{k-1}(6n-2)$ $P_1 = \sum_{n=0}^{0}(6(0)-2) = -2$ $P_2 = \sum_{n=0}^{2-1}(6n-2) = -2 + 4 = 2$ $P_3 = \sum_{n=0}^{3-1}(6n-2) = -2 + 4 + 10 = 12$	✓ $P_1 = \sum_{n=0}^{0}(6(0)-2)$ ✓ $P_2 = S_2 = -2 + 4$ ✓ $P_3 = S_3 = -2 + 4 + 10$ (3)
2.3.2	$-2 \quad 2 \quad 12 \quad 28$ $4 \quad 10 \quad 16$ $6 \quad 6$ $2a = 6$ $a = 3$ $3a + b = T_2 - T_1$ $3(3) + b = 4$ $b = -5$ $a + b + c = T_1$ $3 - 5 + c = -2$ $c = 0$ $\therefore P_k = 3k^2 - 5k$	✓ $a = 3$ ✓ $b = -5$ ✓ $c = 0$ ✓ answer (4)
2.3.3	$P_{50} = 3(50)^2 - 5(50)$ $= 7\,250$	✓ substitution ✓ answer (2)

2.3.4	$P_{50} + S_m = P_q$ $S_m = P_q - P_{50} = 7\,920 + m$ $S_m = \frac{m}{2}[2(298) + (m-1)(6)]$ $7\,920 + m = \frac{m}{2}[596 + 6m - 6]$ $15\,840 + 2m = 590m + 6m^2$ $0 = 6m^2 + 588m - 15\,840$ $0 = m^2 + 98m - 2\,640$ $0 = (m-22)(m+120)$ $m = 22$ or $m = -120$ *n.a.* $\therefore$ 22 terms must be added to P_{50}.	✓ $a = 298$ ✓ substitution into correct formula ✓ $S_m = 7\,920 + m$ ✓ standard form ✓ $m = 22$ (5)
	OR $P_q - P_{50} = 7920 + m$ $P_q - 7\,250 = 7\,920 + m$ $P_q = 15\,170 + m$ $q = 50 + m$ $P_k = 3k^2 - 5k$ $15\,170 + m = 3(50 + m)^2 - 5(50 + m)$ $15\,170 + m = 3(2\,500 + 100m + m^2) - 250 - 5m$ $0 = 3m^2 + 294m - 7\,920$ $0 = m^2 + 98m - 2\,640$ $0 = (m-22)(m+120)$ $m = 22$ or $m = -120$ *n.a.* $\therefore$ 22 terms must be added to P_{50}.	✓ $k = 50 + m$ ✓ substitution into correct formula ✓ $P_k = 15\,170 + m$ ✓ standard form ✓ $m = 22$ (5) **[17]**

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QUESTION 3

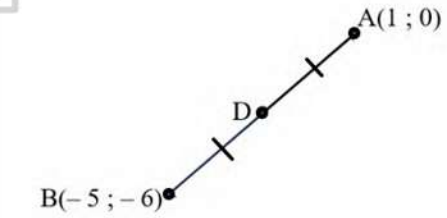
3.1	$17(0,2) = 3,4$ m above the ground	✓ answer	(1)
3.2	radius : $15;\ 15\left(\frac{4}{5}\right);\ 15\left(\frac{4}{5}\right)^2;\ ...$ radius: $T_n = ar^{n-1}$ $T_{17} = 15\left(\frac{4}{5}\right)^{17-1}$ $= 0,4222124651$ $V = \pi r^2 h$ $V_{17} = \pi(0,4222124651)^2(0,2)$ $= 0,11\ m^3$ **OR** radius : $15;\ 15\left(\frac{4}{5}\right);\ 15\left(\frac{4}{5}\right)^2;\ ...$ volume: $V = \pi r^2 h$ $\pi(15)^2(0,2);\ \pi\left(15\times\left(\frac{4}{5}\right)\right)^2(0,2);\ \pi\left(15\times\left(\frac{4}{5}\right)^2\right)^2(0,2);\ ...$ $T_n = ar^{n-1}$ $T_{17} = \pi(15)^2(0,2)\left(\frac{16}{25}\right)^{17-1}$ $= 0,11\ m^3$	✓ substitution into T_n ✓ substitution: volume ✓ answer ✓ substitution: volume ✓ substitution into T_n ✓ answer	(3) (3)
3.3	volume : $\pi(15)^2(0,2);\ \pi\left(15\left(\frac{4}{5}\right)\right)^2(0,2);\ ...$ $\therefore a = \pi(15)^2(0,2) = 45\pi$ $r = \left(\frac{4}{5}\right)^2$ $S_n = \frac{a(r^n - 1)}{r - 1}$ $S_{17} = \frac{45\pi\left[\left(\left(\frac{4}{5}\right)^2\right)^{17} - 1\right]}{\left(\frac{4}{5}\right)^2 - 1}$ $= 392,50\ m^2$	✓ a ✓ r ✓ substitution into S_n ✓ answer	(4) **[8]**

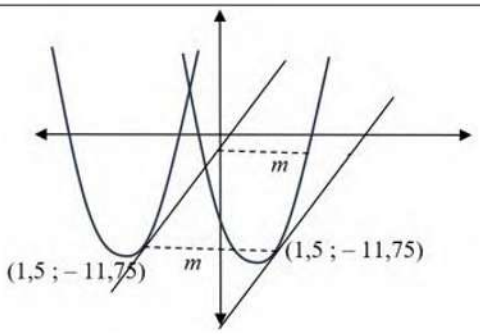
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QUESTION 4

4.1	$q=\left(\frac{2}{5}\right)^{-2}$ $=\frac{25}{4}$	✓ substitution ✓ answer (2)
4.2	$g: \quad y=\left(\frac{2}{5}\right)^{x}$ $g^{-1}(x): x=\left(\frac{2}{5}\right)^{y}$ $y=\log_{\frac{2}{5}} x \; ; \; x>0$	✓ swop x and y ✓ $y=\log_{\frac{2}{5}} x$ (2)
4.3	$x \in (0\,;\infty)$ **OR** $x>0; x \in R$	✓ $0\,;\infty$ ✓ notation (2) ✓✓ answer (2)
4.4	$x \in (0\,;0{,}59]$ **OR** $0<x\leq 0{,}59$	✓ $0\,;0{,}59$ ✓ notation (2) ✓ $0\,;0{,}59$ ✓ notation (2)
4.5	$k(x)=\left(\frac{5}{2}\right)^{-x+2}-\frac{5}{2}$ $=\left(\frac{5}{2}\right)^{-(x-2)}-\frac{5}{2}$ $=\left(\frac{2}{5}\right)^{(x-2)}-\frac{5}{2}$ The graph g shift 2 units right and $\frac{5}{2}$ units down.	✓ $\left(\frac{2}{5}\right)^{(x-2)}-\frac{5}{2}$ ✓ 2 right ✓ $\frac{5}{2}$ down (3) **[11]**

QUESTION 5

5.1	$h(x) = x - 1$ $0 = x - 1$ $x = 1$ A(1 ; 0)	✓ $y = 0$ ✓ $x = 1$ (2)
5.2	 $D\left(\frac{x_1 + x_2}{2} ; \frac{y_1 + y_2}{2}\right)$ $= D\left(\frac{1 - 5}{2} ; \frac{0 - 6}{2}\right) = D\left(\frac{-4}{2} ; \frac{-6}{2}\right)$ $= D(-2 ; -3)$	✓ $\frac{1-5}{2}$ ✓ $\frac{0-6}{2}$ (2)
5.3	$g(x) = \frac{a}{x+2} - 3$ $B(-5 ; -6)$: OR $A(1 ; 0)$: $-6 = \frac{a}{-5+2} - 3$ $0 = \frac{a}{1+2} - 3$ $-3 = \frac{a}{-3}$ $3 = \frac{a}{3}$ $a = 9$ $\therefore g(x) = \frac{9}{x+2} - 3$	✓ substitution of D into g ✓ substitution of B(– 5 ; – 6) or A(1 ; 0) ✓ $a = 9$ (3)
5.4	$f(x) = (x + p)^2 + q$ $= (x - 1)^2 + q$ $D(-2 ; -3)$: $-3 = (-2 - 1)^2 + q$ $-3 = 9 + q$ $q = -12$ $f(x) = (x - 1)^2 - 12$ $f(x) = x^2 - 2x + 1 - 12$ $= x^2 - 2x - 11$	✓ $(x - 1)^2 + q$ ✓ substitution of D ✓ $q = -12$ (3)

5.5	$0 = x^2 - 2x - 11$ $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-11)}}{2(1)}$ $x = 4,46 \quad \text{or} \quad x = -2,46$ **OR** $0 = (x-1)^2 - 12$ $12 = (x-1)^2$ $\pm\sqrt{12} = x - 1$ $x = 4,46 \quad \text{or} \quad x = -2,46$	✓ $y = 0$ ✓ $x = 4,46$ ✓ $x = -2,46$ (3) ✓ $y = 0$ ✓ $x = 4,46$ ✓ $x = -2,46$ (3)
5.6	$(-\infty ; -2,46)$ or $(1 ; 4,46)$ **OR** $x < -2,46 \quad \text{or} \quad 1 < x < 4,46$	✓ $(-\infty ; -2,46)$ ✓ $(1 ; 4,46)$ (2) ✓ $x < -2,46$ ✓ $1 < x < 4,46$ (2)
5.7	$f''(x) = 2$ Maximum value of $\frac{f''(x)}{f(x)+14}$ at turning point of $f(x) + 14$ $= \frac{2}{-12 + 14}$ $= 1$	✓ $f''(x) = 2$ ✓ -12 ✓ answer (3)
5.8	 $f(x) = x^2 - 2x - 11$ $f'(x) = 2x - 2$ $1 = 2x - 2$ $3 = 2x$ $x = \frac{3}{2} = 1,5$ $f(1,5) = (1,5)^2 - 2(1,5) - 11$ $= -11,75$	✓ $f'(x) = 1$ ✓ $x = \frac{3}{2} = 1,5$ ✓ $f(1,5) = -11,75$

	$h(x) = x - 1$ $-11,75 = x - 1$ $x = -10,75$ $m_1 = 10,75 + 1,5$ $= 12,25$ $-1 = x^2 - 2x - 11$ $0 = x^2 - 2x - 10$ $x = 4,32$ or $x = -2,32$ *n.a.* $\therefore 4,32 < m < 12,25$	✓ $x = -10,75$ ✓ answer ✓ $f(x) = -1$ ✓ answer	(7)
	OR $(x + m)^2 - 2(x + m) - 11 = x - 1$ $x^2 + 2mx + m^2 - 2x - 2m - 11 - x + 1 = 0$ $x^2 + (2m - 3)x + (m^2 - 2m - 10) = 0$ $\Delta = b^2 - 4ac$ $= (2m - 3)^2 - 4(1)(m^2 - 2m - 10)$ $= 4m^2 - 12m + 9 - 4m^2 + 8m + 40$ $= -4m + 49$ To touch $\Delta = 0$ $0 = -4m + 49$ $4m = 49$ $m = \frac{49}{4}$ $= 12,25$ $-1 = x^2 - 2x - 11$ $0 = x^2 - 2x - 10$ $x = 4,32$ or $x = -2,32$ *n.a.* $4,32 < m < 12,25$	✓ standard form ✓ substitution ✓ simplification ✓ $\Delta = 0$ ✓ answer ✓ $f(x) = -1$ ✓ answer	(7) **[25]**

QUESTION 6

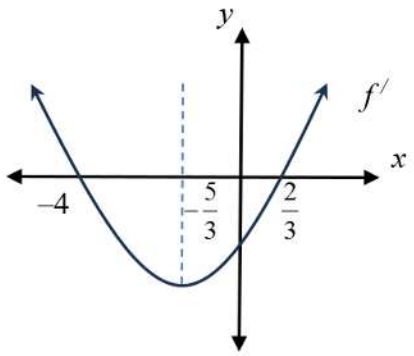
6.1	$F = \frac{x\left[(1+i)^n - 1\right]}{i}$ $= \frac{3\,000\left[\left(1+\frac{0,075}{12}\right)^{20\times12} - 1\right]}{\frac{0,075}{12}}$ $= R1\,661\,192,18$	✓ $i = \frac{0,075}{12}$ ✓ $n = 20\text{x}12 = 240$ ✓ substitution ✓ answer (4)
6.2.1	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{m}\right)^m$ $= \left(1 + \frac{0,075}{12}\right)^{12}$ $= 1,077632599$ $\therefore i_{eff} = 0,077632599$ $\therefore r = 7,7633\%$	✓ substitution ✓ simplification ✓ answer (3)
6.2.2	Amount short on 31 Dec 2023 $= R3\,500\,000 - R1\,661\,192,18$ $= R1\,838\,807,83$ Amount short on 31 Dec 2021 $A = P(1+i)^n$ $1\,838\,807,82 = P\left(1 + \frac{0,075}{12}\right)^{2\times12}$ $P = R1\,583\,415,54$ $F = \frac{x\left[(1+i)^n - 1\right]}{i}$ $1\,583\,415,54 = \frac{x\left[(1+0,077633)^{17} - 1\right]}{0,077633}$ $x = R47\,932,46$	✓ R3 500 000 - F ✓ substitution ✓ answer ✓ $n = 17$ ✓ substitution ✓ answer (6) **[13]**

QUESTION 7

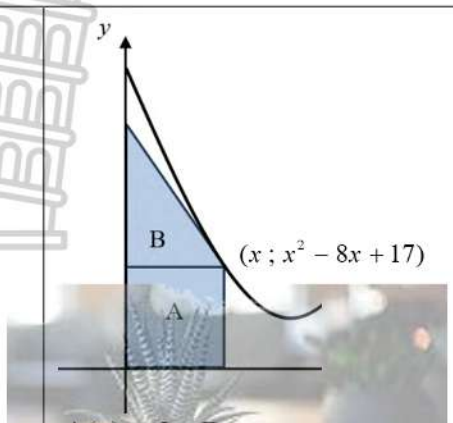
7.1	$f(x) = 5x^2 + 2x$	
	$f(x+h) = 5(x+h)^2 + 2(x+h)$	✓ substitution of $(x+h)$
	$= 5(x^2 + 2xh + h^2) + 2x + 2h$	
	$= 5x^2 + 10xh + 5h^2 + 2x + 2h$	✓ simplify $f(x+h)$
	$f(x+h) - f(x) = (5x^2 + 10xh + 5h^2 + 2x + 2h) - (5x^2 + 2x)$	
	$= 10xh + 5h^2 + 2h$	✓ simplification
	$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$	
	$= \lim_{h \to 0} \frac{10xh + 5h^2 + 2h}{h}$	
	$= \lim_{h \to 0} \frac{h(10x + 5h + 2)}{h}$	✓ factors
	$= \lim_{h \to 0} (10x + 5h + 2)$	
	$= 10x + 2$	✓ answer (5)
	OR	
	$f(x) = 5x^2 + 2x$	
	$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$	
	$f'(x) = \lim_{h \to 0} \frac{[5(x+h)^2 + 2(x+h)] - (5x^2 + 2x)}{h}$	✓ substitution of $(x+h)$
	$= \lim_{h \to 0} \frac{5(x^2 + 2xh + h^2) + 2x + 2h - 5x^2 - 2x}{h}$	
	$f'(x) = \lim_{h \to 0} \frac{5x^2 + 10xh + 5h^2 + 2x + 2h - 5x^2 - 2x}{h}$	✓ simplify $f(x+h)$
	$= \lim_{h \to 0} \frac{10xh + 5h^2 + 2h}{h}$	✓ simplification
	$= \lim_{h \to 0} \frac{h(10x + 5h + 2)}{h}$	✓ factors
	$= \lim_{h \to 0} (10x + 5h + 2)$	
	$= 10x + 2$	✓ answer (5)
7.2.1	$f(x) = 5x^4 - x^3 + 2x$	
	$f'(x) = 20x^3 - 3x^2 + 2$	✓ $20x^3$ ✓ $-3x^2$ ✓ 2 (3)

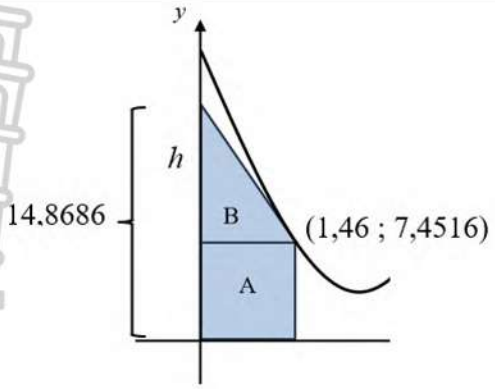
7.2.2	$f(x)=\dfrac{8x^{\frac{1}{2}}+4}{2x^3}$ $=\dfrac{8x^{\frac{1}{2}}}{2x^3}+\dfrac{4}{2x^3}$ $=4x^{-\frac{5}{2}}+2x^{-3}$ $f'(x)=-10x^{-\frac{7}{2}}-6x^{-4}$	✓ $4x^{-\frac{5}{2}}$ ✓ $2x^{-3}$ ✓ $-10x^{-\frac{7}{2}}$ ✓ $-6x^{-4}$ (4)
7.3	$2xt=7$ $x=\dfrac{7}{2t}$ $y=4x^2-3$ $y=4\left(\dfrac{7}{2t}\right)^2-3$ $=4\left(\dfrac{49}{4t^2}\right)-3$ $=49t^{-2}-3$ $\dfrac{dy}{dt}=-98t^{-3}$	✓ x the subject ✓ substitution ✓ simplification ✓ answer (4) **[16]**

QUESTION 8

8.1	$f(x) = x^3 + ax^2 + bx + c$ $f'(x) = 3x^2 + 2ax + b$ $f''(x) = 6x + 2a$ $0 = 6\left(-\frac{5}{3}\right) + 2a$ $2a = 10$ $a = 5$ $f'(x) = 3x^2 + 2(5)x + b$ $-16 = 3(-2)^2 + 10(-2) + b$ $-16 = 12 - 20 + b$ $b = -8$ $f(x) = x^3 + 5x^2 - 8x + c$ $16 = (-2)^3 + 5(-2)^2 - 8(-2) + c$ $16 = 28 + c$ $c = -12$	✓ $f'(x) = 3x^2 + 2ax + b$ ✓ $f''(x) = 6x + 2a$ ✓ $f''\left(-\frac{5}{3}\right) = 0$ ✓ $f'(-2) = -16$ ✓ $f(-2) = 16$ (5)
8.2	$f(x) = x^3 + 5x^2 - 8x - 12$ $f'(x) = 3x^2 + 10x - 8$ $0 = 3x^2 + 10x - 8$ $0 = (3x - 2)(x + 4)$ $x = \frac{2}{3}$ or $x = -4$ $y = -14{,}81 \quad y = 36$ $Q\left(\frac{2}{3}; -14{,}81\right)$ P$(-4; 36)$	✓ $0 = 3x^2 + 10x - 8$ ✓ both x-answers ✓ both y-answers (3)
8.3		✓ both x-intercepts ✓ x-value of turning point ✓ shape (3) **[11]**

QUESTION 9

9.1	 $A(x) = L \times B$ $= (x)(x^2 - 8x + 17)$ $= x^3 - 8x^2 + 17x$	✓ $(x)(x^2 - 8x + 17)$ (1)
9.2	Maximum area : $A'(x) = 3x^2 - 16x + 17$ $0 = 3x^2 - 16x + 17$ $x = 3{,}87$ or $x = 1{,}46$ *n.a.* max area $= (1{,}46)^3 - 8(1{,}46)^2 + 17(1{,}46)$ $= 10{,}88\,\text{unit}^2$	✓ $A'(x)$ ✓ $A'(x) = 0$ ✓ $x = 1{,}46$ ✓ substitution ✓ answer (5)
9.3	$f'(x) = 2x - 8$ $m = -\frac{p}{x} = 2x - 8$ $p = -2x^2 + 8x$ area $= \frac{1}{2}bh$ $= \frac{1}{2}(x)(-2x^2 + 8x)$ $= -x^3 + 4x^2$ $= -(1{,}46)^3 + 4(1{,}46)^2$ $= 5{,}41$ $\therefore 5{,}41\ \text{unit}^2$ **OR**	✓ $-\frac{p}{x} = 2x - 8$ ✓ substitution ✓ substitution ✓ answer (4)



$f(x) = x^2 - 8x + 17$

$f'(x) = 2x - 8$

$= 2(1,46) - 8$

$= -5,08$ ✓ $f'(1,46) = -5,08$

$f(1,46) = (1,46)^2 - 8(1,46) + 17$

$= 7,4516$ ✓ $f(1,46) = 7,4516$

$y - y_1 = m(x - x_1)$

$y - 7,4516 = -5,08(x - 1,46)$ ✓ y-intercept

$y = -5,08x + 14,8686$

$\therefore h = 14,8686 - 7,4516 = 7,42$

$\therefore \text{Area} = \frac{1}{2}bh$

$= \frac{1}{2}(1,46)(7,417)$ ✓ answer (4)

$= 5,41 \text{ unit}^2$ **[10]**

QUESTION 10

10.1	$P(\text{Tom or Harry}) = 1 - 0,42$ $= 0,58$	✓answer (1)
10.2	$P(T \text{ and } H) = P(T) \times P(H)$ $P(T \text{ or } H) = P(T) + P(H) - P(T \text{ and } H)$ $0,58 = 0,4 + P(H) - P(T) \times P(H)$ $0,58 = 0,4 + P(H) - (0,4) \times P(H)$ $0,18 = 0,6P(H)$ $0,3 = P(H)$ $\therefore P(T \text{ and } H) = P(T) \times P(H)$ $= (0,4)(0,3)$ $= 0,12$	✓ $P(T \text{ and } H) = P(T) \times P(H)$ ✓ substitution ✓ $P(H) = 0,3$ ✓ answer (4)
10.3	$P(\text{only T}) = 0,4 - 0,12$ $= 0,28$	✓ answer (1)
10.4	$P(H \text{ and } D) = 0,16$ $P(H \text{ or } D) = P(H) + P(D) - P(H \text{ and } D)$ $0,3 = 0,3 + P(D) - 0,16$ $P(D) = 0,16$	✓ substitution ✓ answer (2)
10.5	No Harry is always absent from the mathematics class on the same days that Dic is absent.	✓ No (1) **[9]**

QUESTION 11

11.1	$(10)(9) = 90$	✓ $(10)(9) = 90$ (1)
11.2	$2 \times 2! \times 2! \times 6! = 5\,760$	✓ $2 \times 2! \times 2!$ ✓ $2 \times 2! \times 2! \times 6! = 5\,760$ (2)
11.3	$\frac{5 \times 8! \times 4}{10!} = 0,22$	✓ 5×4 ✓ $8!$ ✓ $\frac{5 \times 8! \times 4}{10!} = 0,22$ (3) **[6]**
		TOTAL: 150

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COGNITIVE LEVELS **MATHEMATICS P1**

	COGNITIVE LEVELS				TOPICS						
	LEVEL 1 (20%)	LEVEL 2 (35%)	LEVEL 3 (30%)	LEVEL 4 (15%)							
QUESTION	KNOWLEDGE	ROUTINE PROCEDURES	COMPLEX PROCEDURES	PROBLEM SOLVING	ALGEBRA	PATTERNS	FUNCTIONS	FINANCE	DIFFERENTIATION	PROBABILITY	TOTAL MARKS
1.1.1	2				2						
1.1.2	3				3						
1.1.3		4			4						
1.1.4		5			5						
1.2		6			6						
1.3			4		4						**24**
2.1	1					1					
2.2	2					2					
2.3.1		3				3					
2.3.2		4				4					
2.3.3	2					2					
2.3.4				5		5					**17**
3.1.1	1					1					
3.1.2		3				3					
3.1.3			4			4					**8**
4.1	2						2				
4.2		2					2				
4.3	2						2				
4.4		2					2				
4.5			3				3				**11**
5.1		2					2				
5.2				2			2				
5.3		3					3				
5.4		3					3				
5.5		3					3				
5.6			2				2				
5.7				3			3				
5.8			7				7				**25**
6.1		4						4			
6.2.1	3							3			
6.2.2			6					6			**13**
7.1	5								5		
7.2.1	3								3		
7.2.2		4							4		
7.3				4					4		**16**
8.1			5						5		
8.2		3							3		
8.3	3								3		**11**

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	COGNITIVE LEVELS				TOPICS						
	LEVEL 1 (25%)	LEVEL 2 (30 %)	LEVEL 3 (30%)	LEVEL 4 (15%)							
QUESTION	KNOWLEDGE	ROUTINE PROCEDURES	COMPLEX PROCEDURES	PROBLEM SOLVING	ALGEBRA	PATTERNS	FUNCTIONS	FINANCE	DIFFERENTIATION	PROBABILITY	TOTAL MARKS
9.1			1						1		
9.2			5						5		
9.3				4					4		**10**
10.1	1									1	
10.2				4						4	
10.3		1								1	
10.4			2							2	
10.5				1						1	**9**
11.1		1								1	
11.2			2							2	
11.3			3							3	**6**
TOT	**30**	**53**	**44**	**23**	**24**	**25**	**36**	**13**	**37**	**15**	**150**
%	**20%**	**35%**	**29%**	**15%**							
PoI	**20%**	**35%**	**30%**	**15%**	**25**	**25**	**35**	**15**	**35**	**15**	**150**

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