PLC COMMON PAPER

JOHANNESBURG EAST DISTRICT

GRADE 11

MARKING GUIDELINE

MATHEMATICS P1

JUNE 2026

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MARKS: **100**

This marking guideline consists of 11 pages including the cover page.

NOTES:

• If a candidate answers a question TWICE, only mark the FIRST attempt.

• If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.

• Consistent accuracy applies in ALL aspects of the marking guidelines. Stop marking at the second calculation error.

• Assuming answers/values to solve a problem is NOT acceptable.

QUESTION 1		
1.1.1	$\left(\frac{16}{x^{-4}}\right)^{\frac{3}{4}}$ $= (16x^4)^{\frac{3}{4}}$ $= (2^4x^4)^{\frac{3}{4}}$ $= (2x)^3$ $= 8x^3$ OR $= \left(\sqrt[4]{16x^4}\right)^3$ $= (2x)^3$ $= 8x^3$	✓ $(16x^4)^{\frac{3}{4}}$ ✓2^4 ✓ answer **OR** ✓ $\left(\sqrt[4]{16x^4}\right)^3$ ✓$(2x)^3$ ✓ answer **(3)**
1.1.2	$\left(\sqrt{8x} - \sqrt{12x}\right)\left(\sqrt{8x} + \sqrt{12x}\right)$ $= \left(\sqrt{8x}\right)^2 - \left(\sqrt{12x}\right)^2$ $= 8x - 12x$ $= -4x$ **OR** $\left(\sqrt{8x} - \sqrt{12x}\right)\left(\sqrt{8x} + \sqrt{12x}\right)$ $= 8x - 12x$ $= -4x$	✓ applying $a^2 - b^2$ *correctly* ✓ correct squaring ✓ answer **(3)** **OR** ✓$8x$ ✓$-12x$ ✓$-4x$

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1.1.3	$\frac{2^{2n-4}\cdot 8^{5-2n}}{16^{3-n}}$ $= \frac{2^{2n-4}\cdot 2^{3(5-2n)}}{2^{4(3-n)}}$ $= \frac{2^{2n-4}\cdot 2^{15-6n}}{2^{12-4n}}$ $= \frac{2^{-4n+11}}{2^{12-4n}}$ $= 2^{-4n+4n+11-12}$ $= 2^{-1} or \frac{1}{2}$	✓ 2^3 ✓ 2^{12-4n} ✓ $2^{-4n+4n+11-12}$ ✓ answer **(4)**
1.2.1	$m + \frac{64}{m} = 16$ $m^2 + 64 = 16m$ $m^2 - 16m + 64 = 0$ $(m-8)^2 = 0$ $m = 8$	✓ standard form ✓ factors ✓ answer **(3)**
1.2.2	$2^x + 2^{6-x} = 16$ $2^x + \frac{64}{2^x} = 16$ $2^x = 8$ (from 1.2.1) $2^x = 2^3$ $x = 3$	✓ $\frac{64}{2^x}$ ✓ $2^x = 8$ ✓ answer **(3)**
1.3	Given $2^x = 3$ 8^{x+1} $= (2^3)^{x+1}$ $= 2^{3x+3}$ $= (2^x)^3 \cdot 2^3$ $= (3)^3 \cdot 8$ $= 27 \cdot 8$ $= 216$	✓ applying the law $(a^m)^n = a^{m\cdot n}$ ✓ sub $2^x = 3$ ✓ answer **(3)**
		[19]

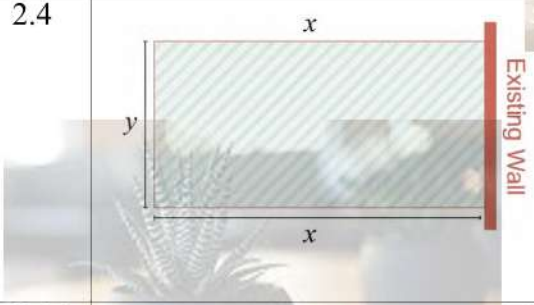
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QUESTION 2		
2.1.1	$x(3+x)=0$ $x=0\ or\ x=-3$	✓ $x=0$ ✓ $x=-3$ **(2)**
2.1.2	$3x^2+8x+2=0$ $=\frac{-8\pm\sqrt{8^2-4(3)(2)}}{2(3)}$ $x=-2{,}39\ or\ x=-0{,}28$	✓ substitution into correct formula ✓$-2{,}39$ ✓ $-0{,}28$ **(3)**
2.1.3	$-x^2+2x+15<0$ $x^2-2x-15>0$ $(x-5)(x+3)>0$ $C.Vs\ are$: $x=5\ or\ x=-3$ $\therefore x<-3\ or\ x>5$ OR/OF $(-\infty;-3)or(5;\infty)$	✓ standard form ✓ critical values ✓ $x<-3$ ✓ $x>5$ **(4)**
2.1.4	$\sqrt{2(1-x)}=x-1$ $\left(\sqrt{2(1-x)}\right)^2=(x-1)^2$ $2(1-x)=x^2-2x+1$ $2-2x=x^2-2x+1$ $x^2-1=0$ $(x-1)(x+1)=0$ $x=1\ or\ x\neq-1$	✓ squaring both sides ✓ simplification ✓ standard form ✓ Answer with selection **(4)**
2.2.	$y-2=2(x-1)^2$ and $y-x=2$ $y=2+x\ \ldots\ldots\ldots\ldots\ldots(3)$ Sub eq(3) into eq(1): $2+x-2=2(x-1)^2$ $x=2x^2-4x+2$ $2x^2-5x+2=0$ $(2x-1)(x-2)=0$ $x=\frac{1}{2}\ or\ x=2$	✓ equation 3 ✓ substitution ✓ standard form ✓x-values

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	Sub x-values into eq(3): $y = 2 + \frac{1}{2}$ *or* $y = 2 + 2$ $y = \frac{5}{2}$ *or* $y = 4$	✓y-values
	OR	**OR**
	$y - 2 = 2(x-1)^2$ and $y - x = 2$ $y - 2 = x$ ... ... (3)	✓ equation 3
	Sub eq(3) into eq(1): $y - 2 = 2(y - 2 - 1)^2$ $y - 2 = 2y^2 - 12y + 18$	✓ substitution
	$2y^2 - 13y + 20 = 0$ $(2y - 5)(y - 4) = 0$	✓ standard form
	$y = \frac{5}{2}$ *or* $y = 4$	✓y-values
	Sub x-values into eq(3): $x = \frac{5}{2} - 2$ *or* $y = 4 - 2$ $x = \frac{1}{2}$ *or* $x = 2$	✓x-values
	OR	**OR**
	$y - 2 = 2(x-1)^2$ and $y - x = 2$ $y = 2(x-1)^2 + 2$ ... ... (3)	✓ equation 3
	Sub eq(3) into eq(1): $2(x-1)^2 + 2 - x = 2$	✓ substitution
	$2x^2 - 4x + 2 + 2 - x = 2$ $2x^2 - 5x + 2 = 0$	✓ standard form
	$(2x - 1)(x - 2) = 0$ $x = \frac{1}{2}$ *or* $x = 2$	✓x-values
	Sub x-values into eq(3): $y = 2 + \frac{1}{2}$ *or* $y = 2 + 2$ $y = \frac{5}{2}$ *or* $y = 4$	✓y-values **(5)**

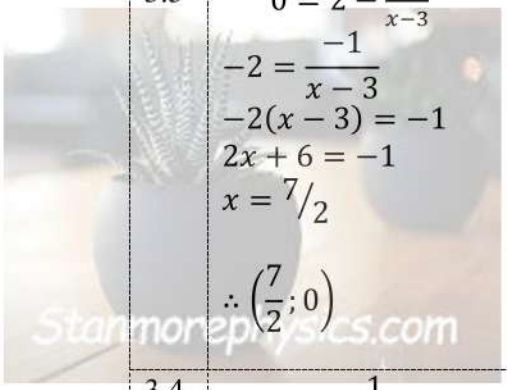
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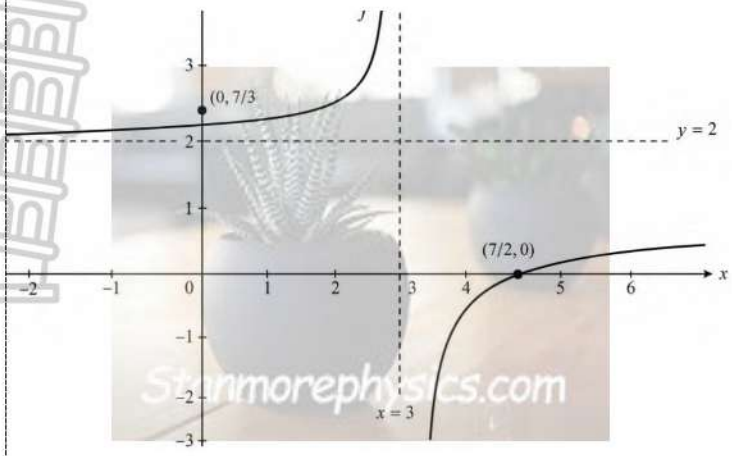
2.3	$x^2 + mx + 4 = 3x$ $x^2 + mx - 3x + 4 = 0$ $x^2 + x(m-3) + 4 = 0$ $b^2 - 4ac < 0$ $(m-3)^2 - 4(1)(4) < 0$ $m^2 - 6m + 9 - 16 < 0$ $m^2 - 6m - 7 < 0$ $(m-7)(m+1) < 0$ C.Vs are: $m = 7 \text{ or } m = -1$ $\therefore\ -1 < m < 7$	✓ standard form ✓ $\Delta < 0$ ✓ simplification of Δ ✓ critical values ✓ answer **(5)**
2.4		
2.4.1	$x + y + x = 12$ $2x + y = 12$	✓ $x + y + x = 12$ **(1)**
2.4.2	$A = l \times b$ $A = x \times y$ $but\ y = 12 - 2x$ $\therefore A = x(12 - 2x)$ $A = 12x - 2x^2$	✓ expression for area ✓ making y the subject ✓ substituting **(3)**
2.4.3	$A(x) = 12x - 2x^2$ $x = \frac{-12}{2(-2)}$ $x = 3$ $A(x) = 12(3) - 2(3)^2$ $\therefore\ the\ maximum\ possible\ area = 18\ units^2$	✓ sub ✓ x-coordinate of T.P. ✓ sub ✓ answer

	OR $A(x) = -2x^2 + 12x$ $A(x) = -2(x^2 - 6x)$ $A(x) = -2(x^2 - 6x + 9 - 9)$ $A(x) = -2[(x-3)^2 - 9]$ $A(x) = -2(x-3)^2 + 18$ $\therefore T.P\ (3; 18)$ $\therefore maximum\ \ area\ is\ 18\ units^2\ when\ x = 3$	✓ factoring out -2 ✓ completing the square ✓ simplified vertex form ✓ answer **(4)**
		[31]



QUESTION 3		
3.1	$f(x) = \frac{-1}{x-3} + 2$ $x = 3$ $y = 2$	✓ $x = 3$ ✓ $y = 2$ **(2)**
3.2	$x \neq 3; x \epsilon \mathbb{R}$	✓ answer **(1)**
3.3	$0 = 2 - \frac{1}{x-3}$ $-2 = \frac{-1}{x-3}$ $-2(x-3) = -1$ $2x + 6 = -1$ $x = {}^{7}/_{2}$ $\therefore \left(\frac{7}{2}; 0\right)$	✓ $y=0$ ✓ answer **(2)**
3.4	$y = 2 - \frac{1}{0-3}$ $y = {}^{7}/_{3}$ $\therefore \left(0; \frac{7}{3}\right)$	✓ $x=0$ ✓ answer **(2)**



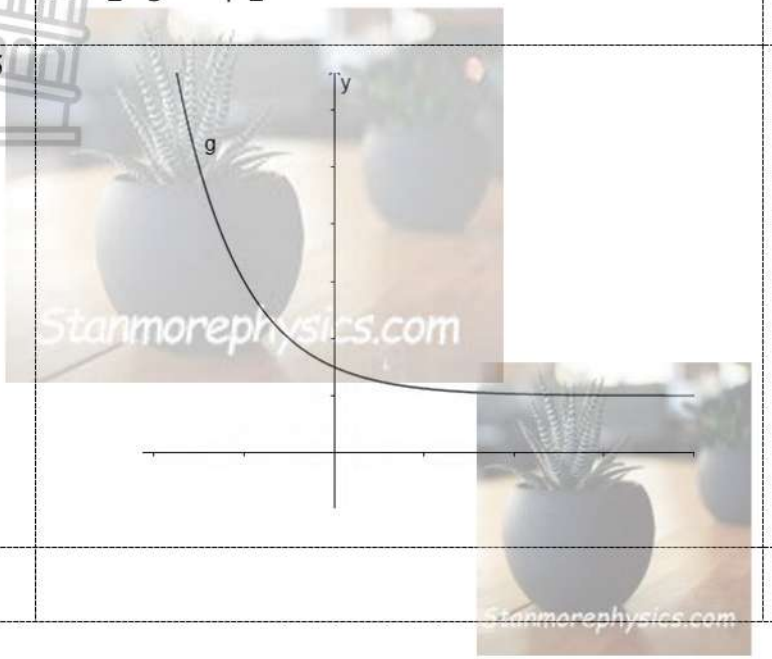
3.5	Stanmorephysics.com	✓ asymptotes ✓ shape ✓ intercepts **(3)**
3.6	$3 < x < {}^{7}/_{2}$ **OR** $x \in \left(3; \frac{7}{2}\right)$	✓✓ answer **(2)**
3.7	$y = x + c \quad sub(3; 2)$ $2 = 3 + c$ $y = x - 1$	✓ positive gradient ✓ sub into correct equation ✓ answer **(3)**
		[15]

QUESTION 4		
4.1	$0 = -x^2 - x + 6$ $x^2 + x - 6 = 0$ $(x + 3)(x - 2) = 0$ $x = -3 \; or \; x = 2$ $\therefore B(-3; 0)$ and $D(2; 0)$	✓ $y = 0$ ✓ factors ✓ B coordinates ✓ D coordinates **(4)**
4.2	$x = \frac{-b}{2a}$ $x = \frac{-(-1)}{2(-1)}$ $x = -\frac{1}{2}$ **OR** $x = \frac{x_{1+}x_2}{2}$ $= \frac{(-3) + (2)}{2}$ $= -\frac{1}{2}$	✓ method ✓ answer OR ✓ method ✓ answer **(2)**

4.3	$f(-\frac{1}{2})$ $=-\left(-\frac{1}{2}\right)^2-\left(-\frac{1}{2}\right)+6$ $=6\frac{1}{4}$ **Answer only full marks** $TP\left(-\frac{1}{2};\frac{25}{4}\right)$ Range $y \in (-\infty;\frac{25}{4}]$ **OR** $y \leq \frac{25}{4}$	✓ Subst ✓ $6\frac{1}{4}$ ✓ Answer **(3)**
4.4	$E(0;6)$ $tan45° = m_{AE}$ $m_{AE} = 1$ $g(x) = x + 6$	✓ coordinates of E ✓ gradient ✓ answer **(3)**
4.5	$f(x) = -\left(x+\frac{1}{2}\right)^2+\frac{25}{4}$ $h(x) = \left(x+\frac{1}{2}-3\right)^2-\frac{25}{4}$ $h(x) = \left(x-\frac{5}{2}\right)^2-\frac{25}{4}$ OR $f(x) = -x^2 - x + 6$ $h(x) = x^2 + x - 6$ $h(x) = (x-3)^2 + (x-3) - 6$ $h(x) = x^2 - 5x$ $h(x) = \left(x-\frac{5}{2}\right)^2-\frac{25}{4}$	✓ in T.P form ✓ $\left(x-\frac{5}{2}\right)^2$ ✓ $-\frac{25}{4}$ OR ✓ $(x-3)^2+(x-3)-6$ ✓ $\left(x-\frac{5}{2}\right)^2$ ✓ $-\frac{25}{4}$ **(3)**
4.6	$-6 < x < 0$ OR $x \in (-6;0)$	✓CVs ✓ notation **(2)**

4.7	$6 < k < {}^{25}/_{4}$	✓✓answer **(2)**
4.8	$r = -2$ by symmetry $p = 1$ $p - r = 3$ OR $-x^2 - x + 6 = 4$ $-x^2 - x + 2 = 0$ $x^2 + x - 2 = 0$ $(x + 2)(x - 1) = 0$ $x = -2 \quad or \quad x = 1$ $r = -2$ $p = 1$ $p - r = 3$	✓ $r = -2$ ✓✓ $p = 1$ ✓ answer **(4)**
		[23]

QUESTION 5		
5.1	$q = 2$ $f(x) = 2 \cdot b^{x+1} + 2 \; sub \; A(1; 20)$ $20 = 2 \cdot b^{1+1} + 2$ $18 = 2 \cdot b^2$ $9 = b^2$ $b = 3$	✓ sub $q = 2$ ✓ sub $A(1; 20)$ ✓ $9 = b^2$ **(3)**
5.2	$y = 2 \cdot 3^{x+1} + 2 \quad sub \; B(-1; y)$ $y = 2 \cdot 3^{-1+1} + 2$ $y = 2 \cdot 1 + 2$ $y = 4$	✓ substitution ✓ answer **(2)**
5.3	$m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{20 - 4}{1 - (-1)}$ $= 8$	✓ substitution ✓ answer **(2)**
5.4	$h(x) = -2 \cdot 3^{x+1} + 2$ OR	✓✓ answer OR

	Reflected about the *x-axis* $= -2 \cdot 3^{x+1} - 2$ $\therefore reflecteed\ about\ the\ asymptote$ $h(x) = -2 \cdot 3^{x+1} - 2 + 4$ $= -2 \cdot 3^{x+1} + 2$	✓ reflection about *x*-axis ✓ answer **(2)**
5.5	Stanmorephysics.com	✓ positive *y*-asymptote ✓ positive *y*-intercept ✓ *g* is decreasing above the asymptote **(3)**
		[12]

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