MABOPANE AND
WINTERVELD PLC

GRADE 11

MARKING GUIDELINES

MATHEMATICS: CONTROL TEST (TERM 1)

24 MARCH 2026

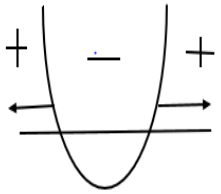
MARKS: 75

This marking guidelines consists of 10 pages

NOTE:

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

QUESTION 1

1.1.1	$x(x-2)+7(x-2)=0$ $(x+7)(x-2)=0$ $x=-7 \quad \text{or} \quad x=2$	✓factors ✓$x=-7$ ✓$x=2$	(3)
1.1.2	$5x^2+2x-6=0$ $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $x=\frac{-2\pm\sqrt{(2)^2-4(5)(-6)}}{2(5)}$ $x=0.91 \text{ or } x=-1.31$ **NOTE:** Penalise 1 mark if the rounding off to TWO decimal places is incorrect	✓ correct substitution into correct formula ✓$x=-0.91$ ✓$x=-1.31$	(3)
1.1.3	$15x-4<9x^2$ $-9x^2+15x-4<0$ $(3x-1)(3x-4)>0$ CV's: $x=\frac{1}{3} \quad \text{or} \quad x=\frac{4}{3}$  $x<\frac{1}{3} \quad \text{or} \quad x>\frac{4}{3}$	✓ standard form ✓ both critical values ✓✓answer	(4)

1.1.4	$9^x + 9 = 10.3^x$ $3^{2x} - 10.3^x + 9 = 0$ Let $k = 3^x$ $k^2 - 10k + 9 = 0$ $(k-1)(k-9) = 0$ $k = 1$ or $k = 9$ $\therefore 3^x = 3^0$ or $3^x = 3^2$ $\therefore x = 0$ or $x = 2$ **OR** $9^x + 9 = 10.3^x$ $3^{2x} - 10.3^x + 9 = 0$ $(3^x - 1)(3^x - 9) = 0$ $3^x = 1$ or $3^x = 9$ $\therefore 3^x = 3^0$ or $3^x = 3^2$ $\therefore x = 0$ or $x = 2$	✓ standard form ✓ k-method ✓ factors ✓ both answers of k ✓ answer **OR** ✓ standard form ✓ factors ✓ both answers for x ✓ prime number base ✓ answer	(5) (5)
1.2	$\frac{x}{2} + \frac{3}{2}y = 1 \ldots\ldots\ldots\ldots$ (1) $y^2 + x = xy + y \ldots\ldots\ldots$ (2) $x = 2 - 3y \ldots\ldots\ldots\ldots\ldots$ (3) from equation (1) Subt (3) into (2) $y^2 + (2 - 3y) = (2 - 3y)y + y$ $y^2 + 2 - 3y = 2y - 3y^2 + y$ $3y^2 + y^2 - 3y - 2y - y + 2 = 0$ $4y^2 - 6y + 2 = 0$ $2y^2 - 3y + 1 = 0$ $(2y - 1)(y - 1) = 0$ $y = \frac{1}{2}$ *or* $y = 1$ $\ldots\ldots\ldots\ldots\ldots$ (4) Subt (4) into (3) $x = \frac{1}{2}$ *or* $x = -1$ $(\frac{1}{2}; \frac{1}{2})$ and $(-1; 1)$	✓$x = 2 - 3y$ ✓subst in (2) ✓standard form ✓factors ✓values of y ✓values of x	(6)

1.3	$x = \frac{4 \pm \sqrt{16-4m(-m+5)}}{2m}$ $16 - 4\text{m}(-\text{m} + 5) < 0$ $m^2 - 5m + 4 < 0$ $(m-4)(m-1) < 0$ $CV's:\ m = 4 \quad or \quad m = 1$ $1 < m < 4$	✓ $\Delta < 0$ ✓ standard form ✓factors ✓ critical values ✓ answer	(5)
			[26]

QUESTION 2

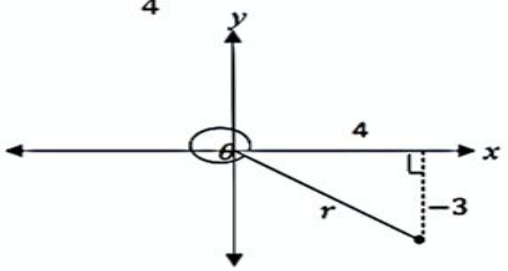
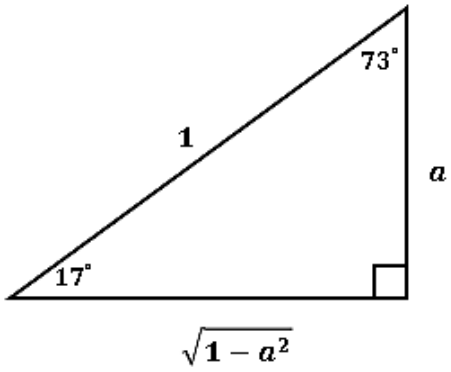
2.1	$A = xy$ $A = x(100 - 2x)$ $A = 100x - 2x^2$ $A = -2x^2 + 100x$	✓ $A = x(100 - 2x)$ ✓ distributing x	(2)
2.2	$A = -2x^2 + 100x$ $A = -2(x^2 - 50x)$ $A = -2\left(x^2 - 50x + \left(\frac{50}{2}\right)^2 - \left(\frac{50}{2}\right)^2\right)$ $A = -2(x^2 - 50x + 625 - 625)$ $A = -2\left[(x-25)^2 - 625\right]$ $A = -2(x-25)^2 + 1250$ $\therefore$ The maximum area is 1250 m	✓ method of completing the square ✓ $A = -2\left[(x-25)^2 - 625\right]$ ✓ $A = -2(x-25)^2 + 1250$ ✓ answer	(4)
			[6]

QUESTION 3

3.1.1	$64^{-\frac{2}{3}}$ $=(2^6)^{-\frac{2}{3}}$ $=2^{-4}$ $=\frac{1}{16}$ **OR** $=(4^3)^{-\frac{2}{3}}$ $=4^{-2}$ $=\frac{1}{16}$ **OR** $=\frac{1}{64^{\frac{2}{3}}}$ $=\frac{1}{\sqrt[3]{64^2}}$ $=\frac{1}{4^2}$	✓ $(2^6)^{-\frac{2}{3}}$ ✓ 2^{-4} ✓$\frac{1}{16}$ **OR** ✓$(4^3)^{-\frac{2}{3}}$ ✓4^{-2} ✓$\frac{1}{16}$ **OR** ✓$\frac{1}{64^{\frac{2}{3}}}$ ✓$\frac{1}{\sqrt[3]{64^2}}$ ✓$\frac{1}{16}$	(3) (3) (3)
3.1.2	$\frac{3^{2n+2}-9^{n-1}}{2.3^{2n+1}}$ $=\frac{3^{2n+2}-3^{2(n-1)}}{2.3.3^{2n}}$ $=\frac{3^{2n+2}-3^{2n-2}}{2.3.3^{2n}}$ $=\frac{3^{2n}.3^2-3^{2n}.3^{-2}}{2.3.3^{2n}}$ $=\frac{3^{2n}(3^2-3^{-2})}{6.3^{2n}}$ $=\frac{9-\frac{1}{9}}{6}$ $=\frac{80}{9}\times\frac{1}{6}$ $=\frac{40}{27}$	✓ exponential laws (base 3) ✓ common factor ✓ simplification ✓ answer	(4)

3.1.3	$\left(\frac{\sqrt{7^{2011}}-\sqrt{7^{2009}}}{\sqrt{7^{2008}}}+\sqrt{7}\right)^2$ $=\left(\frac{\sqrt{7^{2008}}\left(\sqrt{7^3}-\sqrt{7^1}\right)}{\sqrt{7^{2008}}}+\sqrt{7}\right)^2$ $=\left(\sqrt{7^3}-\sqrt{7^1}+\sqrt{7}\right)^2$ $=(7\sqrt{7}-\sqrt{7}+\sqrt{7})^2$ $=(6\sqrt{7}+\sqrt{7})^2$ $=(7\sqrt{7})^2$ $=343$ **OR** $\left(\frac{\sqrt{7^{2011}}-\sqrt{7^{2009}}}{\sqrt{7^{2008}}}+\sqrt{7}\right)^2$ $=\left(\frac{7^{\frac{2011}{2}}-7^{\frac{2009}{2}}}{7^{\frac{2008}{2}}}+\sqrt{7}\right)^2$ $=\left(\frac{7^{\frac{2009}{2}}(7-1)}{7^{1004}}+\sqrt{7}\right)^2$ $=(7^{\frac{1}{2}}(6)+\sqrt{7})^2$ $=(7\sqrt{7})^2$ $=(49)(7)$ $=343$	✓ $\sqrt{7^{2008}}$ ✓ $\left(\sqrt{7^3}-\sqrt{7^1}\right)$ ✓ $7\sqrt{7}$ ✓ $(7\sqrt{7})^2$ ✓ answer **OR** ✓ $7^{\frac{2009}{2}}(7-1)$ ✓ $(7-1)$ ✓ $7^{\frac{1}{2}}$ ✓ $(7\sqrt{7})^2$ ✓ answer	(5) (5)
			[12]

QUESTION 4

4.1.1	$\tan\theta = -\frac{3}{4}$  $r^2 = (4)^2 + (-3)^2$ Pythagoras $r^2 = 25$ $\therefore r = 5$ $\therefore \sin\theta = -\frac{3}{5}$	✓diagram with values ✓value of r ✓answer $sin\theta$	(3)
4.1.2	$\cos(180° - \theta)$ $= -cos\theta$ $= -\frac{4}{5}$	✓ $-cos\theta$ ✓answer	(2)
4.2	 		
4.2.1	$sin17° = \frac{a}{1}$ $x^2 = (1)^2 - (a)^2$ $\therefore x = \sqrt{1-(a)^2}$ $tan17° = \frac{a}{\sqrt{1-a^2}}$	✓substitution pyth ✓value of x ✓answer	(3)
4.2.2	$sin107° = \sin(90° + 17°)$ $= cos17°$ $= \sqrt{1-a^2}$	✓ $cos17°$ ✓answer	(2)

	OR $\sin 107°$ $= \sin(180° - 73°)$ $= \sin 73°$ $= \sqrt{1-a^2}$	**OR** ✓ $sin73°$ ✓answer	(2)
4.2.3	$cos^2 253° + sin^2 557°$ $=[\cos(180° + 73°)]^2 + [\sin(180° + 17°)]$ $=(-cos73°)^2 + (-sin17°)^2$ $=(-a)^2 + (-a)^2$ $=2a^2$	✓$-cos73°)^2$ ✓$-sin17$ ✓ method ✓ answer	(4)
			[14]

QUESTION 5

5.1.	$\frac{\cos(-180°-x).\tan(360°-x)cos^2(90°-x)}{\sin(180°-x).sinx}$ $= \frac{\cos[-(180°+x)].\tan(360°-x)cos^2(90°-x)}{\sin(180°-x).sinx}$ $= \frac{\cos(180°+x).\tan(360°-x)cos^2(90°-x)}{\sin(180°-x).sinx}$ $= \frac{-\cos(x).(-\tan x).sin^2(x)}{\sin(x).sinx}$ $= \frac{\cos(x).\tan x.sin^2(x)}{sin^2(x)}$ $= \frac{\cos(x).\frac{\sin x}{\cos x}.sin^2(x)}{sin^2(x)}$ $= sinx$	✓$-\cos(x)$ ✓$-\tan x$ ✓$sin^2(x)$ ✓ $sinx$ ✓ $\frac{\sin x}{\cos x}$ ✓ answer $(sinx)$	(6)

5.2	$\frac{sinx}{1+.cosx} = \sqrt{\frac{1-cosx}{1+cosx}}$ RHS: $= \sqrt{\frac{1-cosx}{1+cosx}}$ $= \sqrt{\frac{(1-cosx)}{1+cosx} \times \frac{(1+cosx)}{(1+cosx)}}$ $= \sqrt{\frac{1-\cos^2 x}{(1+\cos x)^2}}$ $= \sqrt{\frac{\sin^2 x}{(1+\cos x)^2}}$ $= \frac{\sqrt{\sin^2 x}}{\sqrt{(1+\cos x)^2}}$ $= \frac{\sin x}{1+ cosx}$ RHS = LHS	✓ multiply by: $\frac{(1+cosx)}{(1+cosx)}$ ✓ $1-\cos^2 x$ ✓ $\sin^2 x$ ✓ simplify roots: $\frac{\sqrt{\sin^2 x}}{\sqrt{(1+\cos x)^2}}$ ✓ answer	(5)
5.3	$3\cos^2 x - 5sinx = 1$ $3(1-\sin^2 x) - 5sinx = 1$ $-3\sin^2 x + 3 - 5sinx - 1 = 0$ $-3\sin^2 x - 5sinx + 2 = 0$ $3\sin^2 x + 5sinx - 2 = 0$ $(3sinx - 1)(sinx + 2) = 0$ $3sinx = 1 \ \ or \ sinx = -2$ $sinx = \frac{1}{3} \ \ or \ sinx = -2$ $ref \ <' s,$ $x = \sin^{-1}(\frac{1}{3}) = 19.47° \ \ or \ \ x \neq \sin^{-1}(-2) \quad N.A$ I. $x = 19.47 + \mathrm{k}.360°, \mathrm{k} \in \mathbb{Z}$ II. $x = 180° - 19.47° + k.360°, k \in \mathbb{Z}$ $x = 160.53° + k.360°, k \in \mathbb{Z}$	✓ $1-\sin^2 x$ ✓ standard form ✓ $sinx = \frac{1}{3} \ \ or \ sinx = -2$ ✓ ref <'s with rejection ✓ solution 1 ✓ solution 2	(6)
			[17]

TOTAL = 75 MARKS

ANALYSIS GRID (GRADE 11 TERM 1 TEST: 24 MARCH 2026)

Q.no	Concepts	Level 1	Level 2	Level 3	Level 4	Total
1.1.1	Solving by factorisation	3				3
1.1.2	Solving by quadratic formula	3				3
1.1.3	Inequalities		4			4
1.1.4	Exponential equation		5			5
1.2	Simultaneous equations		6			6
1.3	Nature of roots			5		5
Total		**6**	**15**	**5**	**0**	**26**
2.1	Area of a rectangle	2				2
2.2	Application of quadratic equations			4		4
Total		**2**	**0**	**4**	**0**	**6**
3.1.1	Laws of exponents	3				3
3.1.2	Exponents with fractions		4			4
3.1.3	Simplification of surds			5		5
Total		**3**	**4**	**5**	**0**	**12**
4.1.1	Terminal Arm		3			3
4.1.2	Reducing trig ratio		2			2
4.2.1	Trig ratio in term of a letter		3			3
4.2.2	Trig ratio in term of a letter		2			2
4.2.3	Numerical Reductions		4			4
Total		**0**	**14**	**0**	**0**	**14**
5.1	Reduction formula			6		6
5.2	Proving Identities			5		5
5.3	General solutions			6		6
Total		**0**	**0**	**17**	**0**	**17**
Gr.Total		**11**	**33**	**31**	**0**	**75**
Expected marks(policy)		**15**	**26,25**	**22,5**	**11,25**	**75**
Actual %		**14,67%**	**44%**	**41,33%**	**0%**	**100**
Expected(policy) %		**20%**	**35%**	**30%**	**15%**	**100**