GCE AS MARKING SCHEME

SUMMER 2025

AS
FURTHER MATHEMATICS
UNIT 1 FURTHER PURE MATHEMATICS A
2305U10-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCE AS FURTHER MATHEMATICS

UNIT 1 FURTHER PURE MATHEMATICS A

SUMMER 2025 MARK SCHEME

Q	Solution	Mark	Notes
1. a)	Substituting $3-2\text{i}$, $(3-2\text{i})^3 = 27-54\text{i}-36+8\text{i}\ (=-9-46\text{i})$ OR $15-10\text{i}-36\text{i}-24$ $(3-2\text{i})^2 = 9-12\text{i}-4\ (=5-12\text{i})$ $f(3-2\text{i}) = (-9-46\text{i})-8(5-12\text{i})+25(3-2\text{i})-26$ $=0$	M1 B1 A1 [3]	 For x^3 with working Convincing
b)	METHOD 1: If $x=3-2\text{i}$ is a root then $x=3+2\text{i}$ is a root $(x-3+2\text{i})(x-3-2\text{i})$ $x^2-6x+13$ is the quadratic factor $x^3-8x^2+25x-26=0$ $(x^2-6x+13)(x-2)=0$ The roots are $x=3-2\text{i}$, $x=3+2\text{i}$, $x=2$	 B1 M1 A1 A1	 M0 no working For $x-2$
	METHOD 2: If $x=3-2\text{i}$ is a root then $x=3+2\text{i}$ is a root Let other root be α $\therefore 3-2\text{i}+3+2\text{i}+\alpha=8$ $\alpha=2$ The roots are $x=3-2\text{i}$, $x=3+2\text{i}$, $x=2$	 (B1) (M1) (A1) (A1)	 M0 no working
	METHOD 3: If $x=3-2\text{i}$ is a root then $x=3+2\text{i}$ is a root Let other root be α $\therefore (3-2\text{i})(3+2\text{i})\alpha=26$ $13\alpha=26$ $\alpha=2$ The roots are $x=3-2\text{i}$, $x=3+2\text{i}$, $x=2$	 (B1) (M1) (A1) (A1) [4]	 M0 no working
	METHOD 4: If $x=3-2\text{i}$ is a root then $x=3+2\text{i}$ is a root Use of Factor Theorem $f(2)=0$ The roots are $x=3-2\text{i}$, $x=3+2\text{i}$, $x=2$	 (B1) (M1) (A1) (A1) [4]	 M0 no working

Q	Solution	Mark	Notes
c)	METHOD 1: If $\alpha = 3 - 2\mathrm{i}$, $\beta = 3 + 2\mathrm{i}$, $\gamma = 2$		FT for real root only
	Then, $\frac{13}{\alpha} = 3 + 2\mathrm{i}$, $\frac{13}{\beta} = 3 - 2\mathrm{i}$, $\frac{13}{\gamma} = \frac{13}{2}$	B2	B1 for any 2 values
	New equation: Sum of roots: $(3 + 2\mathrm{i}) + (3 - 2\mathrm{i}) + \frac{13}{2} = \frac{25}{2}$ Sum of pairs: $(3 + 2\mathrm{i})(3 - 2\mathrm{i}) + (3 + 2\mathrm{i})\frac{13}{2} + (3 - 2\mathrm{i})\frac{13}{2} = 52$ Product: $(3 + 2\mathrm{i})(3 - 2\mathrm{i})\frac{13}{2} = \frac{169}{2}$	B2	B1 for any 2 values
	Therefore, $\frac{-b}{a} = \frac{25}{2}$, $\frac{c}{a} = 52$, $\frac{-d}{a} = \frac{169}{2}$	B1	FT previous values for B1B1
	New equation: e.g. $x^3 - \frac{25}{2}x^2 + 52x - \frac{169}{2} = 0$ e.g. $2x^3 - 25x^2 + 104x - 169 = 0$	B1	oe ISW Must =0
	METHOD 2: $\alpha + \beta + \gamma = 8$ $\alpha\beta + \beta\gamma + \gamma\alpha = 25$ $\alpha\beta\gamma = 26$	(B1)	FT for real root only any two correct
	New equation roots: Sum of roots: $\frac{13}{\alpha} + \frac{13}{\beta} + \frac{13}{\gamma} = \frac{13(\beta\gamma + \alpha\gamma + \alpha\beta)}{\alpha\beta\gamma} = \frac{13 \times 25}{26} = \frac{25}{2}$	(B1)	
	Sum of pairs: $\left(\frac{13}{\alpha} \times \frac{13}{\beta}\right) + \left(\frac{13}{\beta} \times \frac{13}{\gamma}\right) + \left(\frac{13}{\gamma} \times \frac{13}{\alpha}\right)$ $= \frac{169}{\alpha\beta} + \frac{169}{\beta\gamma} + \frac{169}{\gamma\alpha} = \frac{169(\gamma + \alpha + \beta)}{\alpha\beta\gamma} = \frac{169 \times 8}{26} = 52$	(B1)	
	Product: $\frac{13}{\alpha} \times \frac{13}{\beta} \times \frac{13}{\gamma} = \frac{2197}{\alpha\beta\gamma} = \frac{2197}{26} = \frac{169}{2}$	(B1)	
	Therefore, $\frac{-b}{a} = \frac{25}{2}$, $\frac{c}{a} = 52$, $\frac{-d}{a} = \frac{169}{2}$	(B1)	FT previous values for B1B1
	New equation: e.g. $x^3 - \frac{25}{2}x^2 + 52x - \frac{169}{2} = 0$	(B1)	oe ISW Must =0
	METHOD 3:		
	Substitute $\frac{13}{x}$ in place of x	(M1)	
	$\left(\frac{13}{x}\right)^3 - 8\left(\frac{13}{x}\right)^2 + 25\left(\frac{13}{x}\right) - 26 = 0$	(A1)	
	$\frac{2197}{x^3} - \frac{1352}{x^2} + \frac{325}{x} - 26 = 0$	(A1)	
	Multiplying throughout by x^3 $2197 - 1352x + 325x^2 - 26x^3 = 0$	(m1) (A1)	At least 2 correct terms
	Therefore, $x^3 - \frac{25}{2}x^2 + 52x - \frac{169}{2} = 0$	(A1)	oe ISW Must =0
		[6]	

Q	Solution	Mark	Notes
1. c)	METHOD 4: $\frac{13}{3-2\mathrm{i}} = \frac{13(3+2\mathrm{i})}{(3-2\mathrm{i})(3+2\mathrm{i})}$ OR $\frac{13}{3+2\mathrm{i}} = \frac{13(3-2\mathrm{i})}{(3-2\mathrm{i})(3-2\mathrm{i})}$ leading to $3+2\mathrm{i}$ AND $3-2\mathrm{i}$ Therefore, new roots are $3+2\mathrm{i}$, $3-2\mathrm{i}$, $\frac{13}{2}$ Quadratic factor is $(x-3-2\mathrm{i})(x-3+2\mathrm{i})$ leading to $x^2-6x+13$ Multiplying by $\left(x-\frac{13}{2}\right)$: $x^3-\frac{25}{2}x^2+52x-\frac{169}{2}=0$	 (B2) (M1) (A1) (m1) (A1) [6]	 B1 for any two values FT quadratic factor from (b) for sign errors only Or other pairing $x^2-\frac{19}{2}x+\frac{39}{2}\mp 2\mathrm{i}x\pm 13\mathrm{i}$ oe ISW Must =0
		[13]	

Q	Solution	Mark	Notes
2. a)	L_1: $\mathbf{r} = 3\mathbf{i} + 2\mathbf{j} + 5\mathbf{k} + \lambda(4\mathbf{i} + \mathbf{k} - 3\mathbf{i} - 2\mathbf{j} - 5\mathbf{k})$ $\mathbf{r} = 3\mathbf{i} + 2\mathbf{j} + 5\mathbf{k} + \lambda(\mathbf{i} - 2\mathbf{j} - 4\mathbf{k})$ OR $\mathbf{r} = \begin{pmatrix}3\\2\\5\end{pmatrix} + \lambda\begin{pmatrix}1\\-2\\-4\end{pmatrix}$	M1 A1	Award for L_1 or L_2 Convincing
	L_2: $\mathbf{r} = 3\mathbf{i} + 2\mathbf{j} + 5\mathbf{k} + \mu(-3\mathbf{i} + 2\mathbf{j} - 3\mathbf{i} - 2\mathbf{j} - 5\mathbf{k})$ $\mathbf{r} = 3\mathbf{i} + 2\mathbf{j} + 5\mathbf{k} + \mu(-6\mathbf{i} - 5\mathbf{k})$ oe OR $\mathbf{r} = \begin{pmatrix}3\\2\\5\end{pmatrix} + \mu\begin{pmatrix}-6\\0\\-5\end{pmatrix}$ OR, using point *C*, $\mathbf{r} = -3\mathbf{i} + 2\mathbf{j} + \mu(-6\mathbf{i} - 5\mathbf{k})$ oe OR $\mathbf{r} = \begin{pmatrix}-3\\2\\0\end{pmatrix} + \mu\begin{pmatrix}-6\\0\\-5\end{pmatrix}$	A1	Must be $\mathbf{r}$ =
		[3]	If no marks, award SC1 for both direction vectors with working
b)	Directions: $\mathbf{i} - 2\mathbf{j} - 4\mathbf{k}$ and $-6\mathbf{i} - 5\mathbf{k}$	B1	si FT (a) for L_2
	Angle between vectors: $\cos\theta = \frac{\mathbf{a}.\mathbf{b}}{\lvert\mathbf{a}\rvert\lvert\mathbf{b}\rvert}$		
	$\mathbf{a}.\mathbf{b} = (1 \times -6) + (-2 \times 0) + (-4 \times -5) = 14$ $\lvert\mathbf{a}\rvert = \sqrt{1^2 + (-2)^2 + (-4)^2} = \sqrt{21}$ $\lvert\mathbf{b}\rvert = \sqrt{(-6)^2 + (-5)^2} = \sqrt{61}$	B2	FT their direction vectors B1 for any 2 correct
	$\cos\theta = \frac{14}{\sqrt{21}\sqrt{61}}$	M1	Used
	$\theta = 66.97\ldots°$	A1	cao Accept 67°, 113°
		[5]	
c)i)	From L_1: $x = 3 + \lambda$, $y = 2 - 2\lambda$, $z = 5 - 4\lambda$	B1	si
	Substituting, $2(3 + \lambda) - 3(2 - 2\lambda) + (5 - 4\lambda) = 13$ $5 + 4\lambda = 13$ $\lambda = 2$	M1 A1	FT their x, y, z values for consistent signs only
	Point of intersection: $E(5, -2, -3)$	A1	cao
		[4]	
ii)	$D = \frac{\lvert(2 \times -3) + (-3 \times 2) + (1 \times 0) - 13\rvert}{\sqrt{2^2 + (-3)^2 + 1^2}}$	M1	
	$D = \frac{25}{\sqrt{14}}$ or $\frac{25\sqrt{14}}{14}$ or 6.68… or 6.7	A1	
		[2]	
		[14]	

Q	Solution	Mark	Notes
3. a)	$\left(\frac{5}{1}-\frac{4}{2}-\frac{1}{3}\right)+\left(\frac{5}{2}-\frac{4}{3}-\frac{1}{4}\right)+\left(\frac{5}{3}-\frac{4}{4}-\frac{1}{5}\right)+\cdots$ $+\left(\frac{5}{n-3}-\frac{4}{n-2}-\frac{1}{n-1}\right)+\left(\frac{5}{n-2}-\frac{4}{n-1}-\frac{1}{n}\right)$ $+\left(\frac{5}{n-1}-\frac{4}{n}-\frac{1}{n+1}\right)$	M1 A1	Substituting values At least three correct expansions of which at least 1 must be algebraic
	$=\frac{5}{1}-\frac{4}{2}+\frac{5}{2}$ $-\frac{1}{n}-\frac{4}{n}-\frac{1}{n+1}$	A1 A1	 A0 if any other terms
	$=\frac{11}{2}-\frac{5}{n}-\frac{1}{n+1}$ $a=11,\ b=-5,\ c=-1$	A1 [5]	Accept 5.5 for 1st term ISW
b)	METHOD 1: $\frac{11}{2}-\frac{5}{n}-\frac{1}{n+1}>5$ $-\frac{5}{n}-\frac{1}{n+1}>-0.5$ $\frac{5}{n}+\frac{1}{n+1}<0.5$ $5(n+1)+n<0.5n(n+1)$ $0.5n^2-5.5n-5>0$ $n^2-11n-10>0$ Solving, Critical values = 11.8…, –0.8… $n=12$	 M1 A1 A1 m1 A1	 FT (a) for non-zero a, b, c Removing algebraic fractions Solvable form cao Accept $n\geq 12$
	METHOD 2: $\frac{11}{2}-\frac{5}{n}-\frac{1}{n+1}>5$ $\frac{11n(n+1)-10(n+1)-2n}{2n(n+1)}>5$ $\frac{11n^2+11n-10n-10-2n}{2n(n+1)}>5$ $\frac{11n^2-n-10}{2n(n+1)}>5$ $11n^2-n-10>10n(n+1)$ $n^2-11n-10>0$ Solving, Critical values = 11.8…, –0.8… $n=12$	 (M1) (A1) (A1) (m1) (A1) [5]	 FT (a) for non-zero a, b, c Removing algebraic fractions Solvable form cao Accept $n\geq 12$
		[10]	

Q	Solution	Mark	Notes
4.	Let $z = (a + \mathrm{i}b)^2 = 7 - 24\mathrm{i}$	M1	
	$a^2 + 2ab\mathrm{i} - b^2 = 7 - 24\mathrm{i}$		
	Therefore, $a^2 - b^2 = 7$ and $2ab = -24$	A1	Both
	Solving simultaneous equations e.g. $b = \frac{-12}{a} \rightarrow a^2 - \frac{144}{a^2} = 7$ $a^4 - 144 = 7a^2$	m1	
	$a^4 - 7a^2 - 144 = 0$ $(a^2 - 16)(a^2 + 9) = 0$ $a^2 = 16$ or $a^2 = -9$ (no real solutions) $\therefore a = \pm 4$ AND $b = \mp 3$	A1	Solvable form
	$\sqrt{z} = 4 - 3\mathrm{i}$ or $\sqrt{z} = -4 + 3\mathrm{i}$	A1	Both
		[5]	
		[5]	

5. a)	METHOD 1: Multiplying matrices $\mathbf{M} \times \mathbf{M} = \mathbf{I}$ leading to	M1	
	$a^2 + bc = 1$ $(ab + bd = 0)$ $(ac + dc = 0)$ $bc + d^2 = 1$	A1	Must have 1st and 4th equation
	Rearranging, or equivalent, $a^2 = 1 - bc = d^2$	m1	
	Therefore, $a^2 = d^2$	A1	Convincing
	METHOD 2: Multiplying matrices $\mathbf{M} \times \mathbf{M} = \mathbf{I}$ leading to	(M1)	
	$a^2 + bc = 1$ $(ab + bd = 0)$ $(ac + dc = 0)$ $bc + d^2 = 1$	(A1)	Must have 1st and 4th equation
	Using 2nd equation AND at least one other, $b(a + d) = 0$ $b = 0$ or $a + d = 0$ $a = -d$ $a^2 = d^2$	(m1)	Accept equivalent reasoning with c from 3rd equation
	when $b = 0$, $a^2 = 1$ (from 1st eqn) and $d^2 = 1$ (from 4th eqn)		
	Therefore, $a^2 = d^2$	(A1)	Convincing
		[4]	

Q	Solution	Mark	Notes
5. b)	When $n = 1$, LHS = $\begin{bmatrix} 0 & 2 \\ \frac{1}{2} & 0 \end{bmatrix}$ and RHS = $\begin{bmatrix} 0 & 2 \\ \frac{1}{2} & 0 \end{bmatrix}$ Therefore, proposition is valid for $n = 1$.	B1	
	Assume result is true for $n = k$ i.e. $$\begin{bmatrix} 0 & 2 \\ \frac{1}{2} & 0 \end{bmatrix}^k = \begin{bmatrix} \frac{1}{2}+\frac{(-1)^k}{2} & 1-(-1)^k \\ \frac{1}{4}-\frac{(-1)^k}{4} & \frac{1}{2}+\frac{(-1)^k}{2} \end{bmatrix}$$	M1	
	Consider $n = k + 1$	M1	
	$$\begin{bmatrix} 0 & 2 \\ \frac{1}{2} & 0 \end{bmatrix}^{k+1} = \begin{bmatrix} 0 & 2 \\ \frac{1}{2} & 0 \end{bmatrix}\begin{bmatrix} \frac{1}{2}+\frac{(-1)^k}{2} & 1-(-1)^k \\ \frac{1}{4}-\frac{(-1)^k}{4} & \frac{1}{2}+\frac{(-1)^k}{2} \end{bmatrix}$$	A1	oe
	$$= \begin{bmatrix} 2\left(\frac{1}{4}-\frac{(-1)^k}{4}\right) & 2\left(\frac{1}{2}+\frac{(-1)^k}{2}\right) \\ \frac{1}{2}\left(\frac{1}{2}+\frac{(-1)^k}{2}\right) & \frac{1}{2}\left(1-(-1)^k\right) \end{bmatrix}$$	A1	
	$$= \begin{bmatrix} \frac{1}{2}-\frac{(-1)^k}{2} & 1+(-1)^k \\ \frac{1}{4}+\frac{(-1)^k}{4} & \frac{1}{2}-\frac{(-1)^k}{2} \end{bmatrix}$$		
	$$= \begin{bmatrix} \frac{1}{2}+\frac{(-1)(-1)^k}{2} & 1-(-1)(-1)^k \\ \frac{1}{4}-\frac{(-1)(-1)^k}{4} & \frac{1}{2}+\frac{(-1)(-1)^k}{2} \end{bmatrix}$$	A1	
	$$= \begin{bmatrix} \frac{1}{2}+\frac{(-1)^{k+1}}{2} & 1-(-1)^{k+1} \\ \frac{1}{4}-\frac{(-1)^{k+1}}{4} & \frac{1}{2}+\frac{(-1)^{k+1}}{2} \end{bmatrix}$$		
	If proposition is true for $n = k$, it is also true for $n = k + 1$. As it is true for $n = 1$, by mathematical induction, it is true for all positive integers n.	E1 [7]	Award for a perfect solution including the last line.
		[11]	

Q	Solution	Mark	Notes
6.	$\lvert z-2+5\mathrm{i}\rvert = 3\lvert z+q-\mathrm{i}\rvert$ $\lvert x+\mathrm{i}y-2+5\mathrm{i}\rvert = 3\lvert x+\mathrm{i}y+q-\mathrm{i}\rvert$ $\lvert (x-2)+\mathrm{i}(y+5)\rvert = 3\lvert (x+q)+\mathrm{i}(y-1)\rvert$	M1	
	$\sqrt{(x-2)^2+(y+5)^2} = 3\sqrt{(x+q)^2+(y-1)^2}$	m1	Finding the modulus
	$x^2-4x+4+y^2+10y+25$ $= 9x^2+18qx+9q^2+9y^2-18y+9$	A2	A1 each side of equation
	$8x^2+8y^2+x(18q+4)-28y-20+9q^2=0$		
	x-coordinate at centre point: $\frac{18q+4}{-2\times8}$	m1	Finding x-coordinate from a **circle** equation
	Therefore, $\frac{18q+4}{-2\times8} = -\frac{5}{2}$ leading to $q=2$	A1	cao
		[6]	
		[6]	

7. a)	Reflection matrix: $\begin{pmatrix} -\frac{1}{2} & \frac{\sqrt{3}}{2} & 0 \\ \frac{\sqrt{3}}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$	B1	Accept 2×2 matrix
	Rotation matrix: $\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	B1	Accept 2×2 matrix
	Translation matrix: $\begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}$	B1	
	$T = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} -\frac{1}{2} & \frac{\sqrt{3}}{2} & 0 \\ \frac{\sqrt{3}}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$	M1	
	$T = \begin{pmatrix} -1 & 0 & 2 \\ 0 & -1 & 1 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} -\frac{1}{2} & \frac{\sqrt{3}}{2} & 0 \\ \frac{\sqrt{3}}{2} & \frac{1}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$ or $T = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} \frac{1}{2} & \frac{-\sqrt{3}}{2} & 0 \\ \frac{-\sqrt{3}}{2} & \frac{-1}{2} & 0 \\ 0 & 0 & 1 \end{pmatrix}$	A1	either
	$T = \begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} & 2 \\ -\frac{\sqrt{3}}{2} & -\frac{1}{2} & 1 \\ 0 & 0 & 1 \end{pmatrix}$	A1	
		[6]	If M0, award SC1 for correct matrix following multiplication in reverse order

Q	Solution	Mark	Notes
b)	METHOD 1: $\begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} & 2 \\ -\frac{\sqrt{3}}{2} & -\frac{1}{2} & 1 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \\ 1 \end{pmatrix} = \begin{pmatrix} x \\ y \\ 1 \end{pmatrix}$	M1	FT their T from (a)
	Giving, $\frac{1}{2}x - \frac{\sqrt{3}}{2}y + 2 = x$ AND $-\frac{\sqrt{3}}{2}x - \frac{1}{2}y + 1 = y$	A1	Both equations
	Solving simultaneous equations e.g. collecting like terms leads to $-\frac{\sqrt{3}}{2}y + 2 = \frac{1}{2}x$ and $-\frac{\sqrt{3}}{2}x + 1 = \frac{3}{2}y$	m1	
	Substituting 1st equation into 2nd equation leads to $-\sqrt{3}\left(-\frac{\sqrt{3}}{2}y + 2\right) + 1 = \frac{3}{2}y$ $\frac{3}{2}y - 2\sqrt{3} + 1 = \frac{3}{2}y$ $-2\sqrt{3} + 1 = 0$ (contradiction)	A1	
	Therefore, there are no fixed points under T.	A1	
	METHOD 2: $\begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} & 2 \\ -\frac{\sqrt{3}}{2} & -\frac{1}{2} & 1 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \\ 1 \end{pmatrix} = \begin{pmatrix} x \\ y \\ 1 \end{pmatrix}$	(M1)	FT their T from (a)
	Giving, $\frac{1}{2}x - \frac{\sqrt{3}}{2}y + 2 = x$ AND $-\frac{\sqrt{3}}{2}x - \frac{1}{2}y + 1 = y$	(A1)	Both equations
	Forming a pair or linear equations with equal coefficients for x and for y OR two expressions for $x = \cdots$ or $y = \cdots$ ready to compare e.g. $\sqrt{3}x + 3y = 2$ and $\sqrt{3}x + 3y = 4\sqrt{3}$	(m1)	
	These equations are inconsistent since it is not possible for $\sqrt{3}x + 3y$ to be 2 and $4\sqrt{3}$ simultaneously (contradiction),	(A1)	
	Therefore, there are no fixed points under T.	(A1)	
		[5]	
		[11]	