Question			Answer	Marks	AO	Guidance	
3	(a)		$2 \times 3 = 6$ which is even, hence counterexample	B1 [1]	2.1	Any product involving 2 and a prime number, evaluated and contradiction identified	eg $2 \times 3 = 6$, which is not odd Condone $2 \times 2 = 4$, which is not odd
3	(b)	(i)	$x^2 = 3x \Leftarrow x = 3$	B1 [1]	2.2a	Correct symbol used	Condone $\leftarrow$
3	(b)	(ii)	$x > 4 \Leftrightarrow x^3 > 64$	B1 [1]	2.2a	Correct symbol used	Condone $\leftrightarrow$
3	(b)	(iii)	$x^{\mathrm{o}} = 45^{\mathrm{o}} \Rightarrow \tan x^{\mathrm{o}} = 1$	B1 [1]	2.2a	Correct symbol used	Condone $\rightarrow$

Question			Answer	Marks	AO	Guidance	
3	(c)		$(2m + 1)^2 + (2n + 1)^2$	**B1**	**2.1**	Correct form seen for the sum of the squares of **any** two odd numbers	ie two different variables
			$= 4m^2 + 4m + 1 + 4n^2 + 4n + 1$ $= 4m^2 + 4m + 4n^2 + 4n + 2$	**M1**	**2.1**	Attempt to square, add and collect like terms for their two **distinct** odd numbers	Their odd numbers must both be of the form $2p \pm q$ (where q is odd) May involve a single variable eg $(2n + 1)^2 + (2n + 3)^2$ $= 4n^2 + 4n + 1 + 4n^2 + 12n + 9$ $= 8n^2 + 16n + 10$ Allow sign and/or coefficient errors only
			$2(2m^2 + 2n^2 + 2m + 2n + 1)$ hence multiple of 2	**A1FT**	**2.4**	Show it is a multiple of 2, by taking out a common multiple or arguing that the coefficients in all terms are even	**FT** on their two odd numbers Factorising by 2 is sufficient for **A1** ie no comment required Condone dividing by 2 to show that the quotient would be an integer
			$4(m^2 + n^2 + m + n) + 2$ $4(m^2 + n^2 + m + n)$ is multiple of 4, but 2 is not multiple of 4, so never multiple of 4	**A1**	**2.4**	Not dep on previous **A1**, but must follow **B1 M1** Take out a common multiple from relevant terms, or argue using coefficients of terms, or take out common factor of 4 and argue that remaining factor is not an integer	Must be from **any** two odd numbers (ie two different variables) Condone dividing by 4 to show that the quotient is not an integer Comment required – either refer to the remainder of 2 (including ‘2 more than a multiple of 4’), or that the entire quotient is not an integer, depending on method used
				[4]			**SC B1** for a complete worded argument about two **distinct** odd numbers eg odd^2 = odd for **both** odd numbers; odd + odd = even, hence multiple of 2