FP1 Complex Number Answers

5(a)(i)	Full expansion of product	M1		
	Use of $i^2 = -1$	m1		
	$(2+\sqrt{5}i)(\sqrt{5}-i) = 3\sqrt{5}+3i$	A1	3	$\sqrt{5}\sqrt{5} = 5$ must be used – Accept not fully simplified
(ii)	$z^* = x - iy\ (=\sqrt{5}+i)$	M1		
	Hence result	A1	2	Convincingly shown (AG)
(b)(i)	Other root is $\sqrt{5}+i$	B1	1	

6(a)	$(z+i)^* = x - iy - i$	B2	2	
(b)	$\ldots = 2ix - 2y + 1$	M1		$i^2 = -1$ used at some stage
	Equating R and I parts	M1		involving at least 5 terms in all
	$x = -2y + 1,\ -y - 1 = 2x$	A1√		ft one sign error in (a)
	$z = -1 + i$	m1A1√	5	ditto; allow $x = -1,\ y = 1$
	Total		**7**	

1(a)(i)	Roots are $\pm 4i$	M1A1	2	M1 for one correct root or two correct factors
(ii)	Roots are $1 \pm 4i$	M1A1	2	M1 for correct method
(b)(i)	$(1+x)^3 = 1 + 3x + 3x^2 + x^3$	M1A1	2	M1A0 if one small error
(ii)	$(1+i)^3 = 1 + 3i - 3 - i = -2 + 2i$	M1A1	2	M1 if $i^2 = -1$ used
(iii)	$(1+i)^3 + 2(1+i) - 4i$	M1		with attempt to evaluate
	$\ldots = (-2+2i) + (2-2i) = 0$	A1	2	convincingly shown (**AG**)
	Total		**10**	

3(a)	Use of $z^* = x - iy$	M1		
	$z - 3iz^* = x + iy - 3ix - 3y$	m1		Condone sign error here
	$R = x - 3y,\ I = -3x + y$	A1	3	Condone inclusion of i in I Allow if correct in (b)
(b)	$x - 3y = 16,\ -3x + y = 0$	M1		
	Elimination of x or y	m1		
	$z = -2 - 6i$	A1F	3	Accept $x = -2,\ y = -6$; ft $x + 3y$ for $x - 3y$
	Total		**6**	
