Question Number	Scheme	Notes	Marks
4	$2\log_3(1-x)=\log_3(1-x)^2$ or $3=\log_3 3^3$	Correct power law used or implied	B1
	$\log_3(32-12x)-\log_3(1-x)^2=\log_3\dfrac{32-12x}{(1-x)^2}$ Combines 2 log terms correctly		M1
	$\dfrac{32-12x}{(1-x)^2}=27$	Obtains this equation in any form	A1
	$\Rightarrow 27x^2-42x-5=0\Rightarrow x=\ldots$	Solves 3TQ	M1
	$x=-\dfrac{1}{9}$	This value only i.e. the $\dfrac{5}{3}$ must clearly be discarded if seen.	A1
			(5)
			Total 5

Question Number	Scheme	Marks
5	$\log_2 16x+\log_2(x+1)=3+\log_2(x+6)$	
	$\log_2 a=b\Rightarrow 2^b=a$	B1
	$\log_2 16x(x+1)=\log_2 8(x+6)$	M1
	$2x^2+x-6=0$	A1
	$(2x-3)(x+2)=0$	dM1
	$x=\dfrac{3}{2}$ only	A1cso
		(5 marks)

Question Number	Scheme	Marks
6 (a)	$2\log_4(x+3)=\log_4(x+3)^2$ or $\frac{1}{2}=\log_4 2$ o.e	B1
	Combines two terms e.g. $2\log_4(x+3)+\log_4 x=\log_4 x(x+3)^2$	M1
	e.g. $x(x+3)^2=2(4x+2)$	A1
	e.g. $x(x^2+6x+9)=8x+4\Rightarrow x^3+6x^2+x-4=0$ *	A1*
		(4)
(b) (i)	$x^3+6x^2+x-4=(x+1)(x^2+5x-4)$	M1
	$x=\frac{-5\pm\sqrt{25+16}}{2}\Rightarrow x=\frac{-5\pm\sqrt{41}}{2}$	dM1 A1
		(3)
(ii)	$x=\frac{-5+\sqrt{41}}{2}$	B1
		(1)
		(8 marks)

Question	Answer	Marks	Guidance
7(a)	Equate y to 3 and confirm $p=\frac{1}{2\sin 2p}$	**B1**	AG
		1	
7(b)	Consider sign of $p-\frac{1}{2\sin 2p}$ or equivalent for 0.5 and 0.6	**M1**	
	Obtain –0.09... and 0.06... or equivalents and justify conclusion	**A1**	AG
		2	
7(c)	Use iteration process correctly at least once	**M1**	Need to see 0.55494…
	Obtain final answer 0.557 only	**A1**	Allow recovery. Allow if iterations are to 4sf Allow if insufficient iterations seen.
	Show sufficient iterations to 5 s.f. to justify answer or show sign change in interval [0.5565, 0.5575]	**A1**	If not starting at 0.55 then max marks M1A1A0
		3	

Question Number	Scheme	Marks
6	$2\log_4(x+1)=\log_4(x+1)^2$	B1
	e.g. $\log_4(12-2x)-\log_4(x+1)^2=\log_4\dfrac{12-2x}{(x+1)^2}$	M1
	$\dfrac{12-2x}{(x+1)^2}=16$	A1
	$\Rightarrow 8x^2+17x+2=0\Rightarrow x=\ldots$	M1
	$x=-\dfrac{1}{8}$ oe e.g. -0.125	A1
		(5)
		Total 5

Question Number	**Please read notes for 8(i) before looking at scheme**				Marks
8.(i)	$8^{2x+1}=6\Rightarrow 2x+1=\log_8 6$	M1	$2^{6x+3}=6$		
	$\Rightarrow 2x+1=\dfrac{\log_2 6}{\log_2 8}$	A1	$\Rightarrow(6x+3)\log_2 2=\log_2 6$	M1 A1	
	$\Rightarrow 2x+1=\dfrac{\log_2 2+\log_2 3}{3}$	M1	$\Rightarrow(6x+3)=\log_2 2+\log_2 3$	M1	
	$\Rightarrow x=\dfrac{\log_2 3}{6}-\dfrac{1}{3}$	A1	$\Rightarrow x=\dfrac{\log_2 3}{6}-\dfrac{1}{3}$	A1	**(4)**
(ii)	$\log_5(7-2y)=2\log_5(y+1)-1$		$2\log_5(y+1)-\log_5(7-2y)=1$		
	$\log_5(7-2y)=\log_5(y+1)^2-1$		$\log_5(y+1)^2-\log_5(7-2y)=1$		M1
	$\log_5(7-2y)=\log_5(y+1)^2-\log_5 5$		$\log_5\dfrac{(y+1)^2}{(7-2y)}=1$		dM1
	$(7-2y)=\dfrac{(y+1)^2}{5}$		$\dfrac{(y+1)^2}{(7-2y)}=5$		A1
	$y^2+12y-34=0\Rightarrow y=$		$y^2+12y-34=0\Rightarrow y=$		ddM1
	$y=-6+\sqrt{70}$ oe only				A1
					(5)
					(9 marks)