Question	Answer	Marks	Partial Marks
1	$\frac{4-\sqrt{5}}{7-3\sqrt{5}}\times\frac{7+3\sqrt{5}}{7+3\sqrt{5}}$ attempted	**M1**	
	Correct expansion $\frac{28+12\sqrt{5}-7\sqrt{5}-15}{49-45}$	**M1**	**DEP** condone one arithmetic or sign slip
	$\frac{13+5\sqrt{5}}{4}$ or simplified equivalent	**A1**	
2	Attempts to solve $2(7^{2x})-21(7^{x})-11=0$ or uses $u=7^{x}$ and attempts to solve $2u^{2}-21u-11=0$	**B1**	
	$(2(7^{x})+1)(7^{x}-11)$ or $(2u+1)(u-11)$	**M1**	**FT** *their* $2(7^{2x})+b(7^{x})+c=0$ or $2u^{2}+bu+c=0$ with b and c both non-zero
	$[7^{x}=-\frac{1}{2}$ or$]\quad 7^{x}=11$	**A1**	
	$x=\log_{7}11$ or $\frac{\ln 11}{\ln 7}$ or $\frac{\lg 11}{\lg 7}$ isw or 1.23[227...] only	**A1**	
3(a)	$3^{4}\times x^{\frac{8}{3}}\times y^{\frac{15}{4}}$	**B3**	**B1** for each correct power or **M1** for $\frac{x\left(243x^{\frac{5}{3}}y^{5}\right)}{3y^{\frac{5}{4}}}$ or better
3(b)(i)	$a^{\frac{3}{2}}=64$ or $a^{\frac{3}{4}}=8$ oe	**M1**	
	$a=16$	**A1**	If 0 scored, **SC1** for correctly finding a from $\log_{a}8=k$, where $k\neq 0.75$
3(b)(ii)	Correct change of base to a: $\frac{\log_{a}3a}{\log_{a}a^{2}}$ oe	**M1**	
	Simplifies denominator: $\log_{a}(3a)^{\frac{1}{2}}$ oe	**A1**	