Question	Answer	Marks	Partial Marks
7	$4x^2 + kx + k - 2 = 2x + 1$	**M1**	
	$4x^2 + (k-2)x + k - 3$ [*0] soi	**A1**	* can be <, >, =, ≤, ≥
	$(k-2)^2 - 4(4)(k-3)$	**M1**	
	$k^2 - 20k + 52 * 0$	**A1**	
	$k = \frac{-(-20) \pm \sqrt{(-20)^2 - 4(1)(52)}}{2}$	**M1**	
	$k = 10 \pm \sqrt{48}$ oe isw	**A1**	
	Alternative (using calculus) $2 = 8x + k$ oe	**(M1)**	
	$y = 4x^2 + (2-8x)x + 2 - 8x - 2$ or $y = -4x^2 - 6x$	**(M1)**	
	$0 = 4x^2 + 8x + 1$	**(A1)**	
	$x = \frac{-8 \pm \sqrt{8^2 - 4(4)(1)}}{8}$	**(M1)**	
	$x = -1 \pm \frac{\sqrt{48}}{8}$ oe	**(A1)**	
	for $k = 10 \pm \sqrt{48}$ oe	**(A1)**	
8(a)(i)	Valid explanation e.g. This ensures the argument of both logarithms is greater than 0	**B1**	
8(a)(ii)	$\log_a 6 = \log_a (y+3)^2$ oe	**B1**	
	$(y+3)^2 = 6$	**M1**	
	$y = -3 + \sqrt{6}$ oe only final answer	**A1**	

Question	Answer	Marks	Partial Marks
8(b)	Within a complete expression: Correct change of base to a: $\log_{\sqrt{b}} 9a = \dfrac{\log_a 9a}{\log_a \sqrt{b}}$ Correct use of power law: $\log_a \sqrt{b} = \dfrac{1}{2}\log_a b$ Correct use of addition/multiplication law: $\log_a 9a = \log_a 9 + \log_a a$ Correct use of $\log_a a = 1$	**M3**	**M2** for 2 or 3 correct steps within complete expression or **M1** for 1 correct step within complete expression
	leading to $2 + 3\log_a 9$. nfww	**A1**	
9	$\int \sin\left(6x - \dfrac{\pi}{2}\right) \mathrm{d}x = -\dfrac{\cos\left(6x - \dfrac{\pi}{2}\right)}{6} + c$	**B2**	**B1** for $\int \sin\left(6x - \dfrac{\pi}{2}\right) \mathrm{d}x = k\cos\left(6x - \dfrac{\pi}{2}\right) + c$ where $k < 0$ or $k = \dfrac{1}{6}$ or $-\dfrac{1}{6}\cos\left(6x - \dfrac{\pi}{2}\right)$
	$\dfrac{1}{2} = -\dfrac{1}{6}\cos\left(\dfrac{6\pi}{4} - \dfrac{\pi}{2}\right) + c$	**M1**	**FT** *their k* provided **B1** awarded
	$\int \left(-\dfrac{\cos\left(6x - \dfrac{\pi}{2}\right)}{6} + \dfrac{1}{3}\right) \mathrm{d}x$ $= -\dfrac{\sin\left(6x - \dfrac{\pi}{2}\right)}{36} + \dfrac{1}{3}x + A$	**M2**	**FT** $\textit{their}\, k\cos\left(6x - \dfrac{\pi}{2}\right) + \textit{their}\, c$ provided at least **B1** awarded **M1** for $m\sin\left(6x - \dfrac{\pi}{2}\right) + \left(\textit{their}\, \dfrac{1}{3}\right)x + A$ where $m < 0$ or $m = \dfrac{1}{36}$
	$\dfrac{13\pi}{12} = -\dfrac{1}{36}\sin\left(\dfrac{6\pi}{4} - \dfrac{\pi}{2}\right) + \dfrac{1}{3}\left(\dfrac{\pi}{4}\right) + A$	**M1**	**FT** *their m* and *their c* provided at least **M1** awarded
	$y = -\dfrac{\sin\left(6x - \dfrac{\pi}{2}\right)}{36} + \dfrac{1}{3}x + \pi$ oe cao	**A1**	