1	(i)	Either	Square both sides to obtain three-term quadratic equation	M1	
			Solve three-term quadratic equation to obtain two values	M1	
			Obtain –1 and $\frac{7}{3}$	A1	
		Or	Obtain $\frac{7}{3}$ from graphical method, inspection or linear equation	B1	
			Obtain –1 similarly	B2	[3]
	(ii)		Use logarithmic method to solve an equation of the form $5^y = k$ where k > 0	M1	
			Obtain 0.526 and no others	A1	[2]
2	(i)		Use the iterative formula correctly at least once	M1	
			Obtain final answer 2.289	A1	
			Show sufficient iterations to justify accuracy to 3 d.p. or show sign change in interval (2.2885, 2.2895)	A1	[3]
	(ii)		State $x = 2 + \dfrac{4}{x^2 + 2x + 4}$ or equivalent	B1	
			Obtain $\sqrt[3]{12}$	B1	[2]
3			State or imply that $\ln y = \ln K + m \ln x$	B1	
			Form a numerical expression for gradient of line	M1	
			Obtain –1.39 or –1.4	A1	
			Use their gradient value and one point correctly to obtain intercept	M1	
			Obtain value for $\ln K$ between 4.26 and 4.28	A1	
			Obtain $K = 71$ or $K = 72$ or value rounding to either with no error noted	A1	[6]
4	(i)		Substitute $x = -2$ and equate to zero	M1	
			Solve equation to confirm $a = -4$	A1	[2]
	(ii)	(a)	Find quadratic factor by division, inspection, identity, …	M1	
			Obtain $6x^2 - x - 2$	A1	
			Conclude $(x+2)(3x-2)(2x+1)$	A1	[3]
		(b)	State or imply at least $\sec\theta = -2$ and attempt solution	M1	
			Obtain 120° and no others in range	A1	[2]
5	(i)		Use product rule to obtain form $k_1 e^{-3x} + k_2 x e^{-3x}$	M1	
			Obtain correct $4e^{-3x} - 12xe^{-3x}$	A1	
			Obtain $x = \frac{1}{3}$ or 0.333 or better and no other	A1	[3]

	(ii)	Use quotient rule or equivalent	**M1***	
		Obtain correct numerator $8x(x+1)-4x^2$ or equivalent	**A1**	
		Equate numerator to zero and solve to find at least one value	**M1 dep**	
		Obtain $x=-2$	**A1**	
		Obtain $x=0$	**A1**	[5]
6	**(i)**	Either Obtain $\frac{dx}{dt}=-3\sin t$	**B1**	
		Obtain $\frac{dy}{dt}=-2\sin(t-\frac{1}{6}\pi)$	**B1**	
		Use $\frac{dy}{dx}=\frac{dy}{dt}\div\frac{dx}{dt}$	**M1**	
		Expand $-2\sin(t-\frac{1}{6}\pi)$ to obtain $k_1\sin t+k_2\cos t$	**M1**	
		Confirm given result $\frac{1}{3}(\sqrt{3}-\cot t)$ correctly	**A1**	
		Or Obtain $\frac{dx}{dt}=-3\sin t$	**B1**	
		Expand y to obtain $k_3\cos t+k_4\sin t$	**M1**	
		Obtain $\frac{dy}{dt}=-\sqrt{3}\sin t+\cos t$ or equivalent	**A1**	
		Use $\frac{dy}{dx}=\frac{dy}{dt}\div\frac{dx}{dt}$	**M1**	
		Confirm given result $\frac{1}{3}(\sqrt{3}-\cot t)$ correctly	**A1**	[5]
	(ii)	Identify value of t as $\frac{1}{2}\pi$ only	**B1**	
		Obtain gradient at relevant point as $\frac{1}{3}\sqrt{3}$ or 0.577 or better	**B1**	
		Form equation of tangent through (0, 1), using their gradient	**M1**	
		Obtain $y=\frac{1}{3}\sqrt{3}x+1$ or equivalent	**A1**	[4]
7	**(i)**	Express $\cos^2 x$ in form $k_1+k_2\cos 2x$	**M1**	
		Obtain correct $\frac{1}{2}+\frac{1}{2}\cos 2x$	**A1**	
		Rewrite second term as $\sec^2 x$	**B1**	
		Integrate to obtain at least terms $k_3\sin 2x$ and $k_4\tan x$	**M1**	
		Obtain $\frac{1}{2}x+\frac{1}{4}\sin 2x+\tan x$	**A1**	
		Confirm given result $\frac{1}{6}\pi+\frac{9}{8}\sqrt{3}$	**A1**	[6]
	(ii)	State volume is $\pi\int(\cos x+\frac{1}{\cos x})^2$ (π maybe implied by later appearance)	**B1**	
		Expand to obtain $\pi\int(\cos^2 x+\frac{1}{\cos^2 x}+2)dx$ or $\int(\cos^2 x+\frac{1}{\cos^2 x}+2)dx$	**B1**	
		Integrate integrand involving three terms (in part using part (i) or otherwise i.e. $k_3\sin 2x+k_4\tan x+k_5 x$)	**M1**	
		Obtain $\frac{5}{6}\pi^2+\frac{9}{8}\sqrt{3}\pi$ or exact equivalent	**A1**	[4]