1	**(i)**	Use the iterative formula correctly at least once Obtain final answer 2.289 Show sufficient iterations to justify accuracy to 3 dp or show sign change in interval (2.2885, 2.2895)	**M1** **A1** **B1**	[3]
	(ii)	State equation $x = \frac{4}{x^2} + \frac{2}{3}x$ or equivalent Obtain exact value $12^{\frac{1}{3}}$ or $\sqrt[3]{12}$	**B1** **B1**	[2]
2		State or imply $\ln y = \ln K + p \ln x$ Calculate gradient of line Obtain $p = 1.35$ Substitute to find K Obtain $K = 7.11$ or $K = 7.12$	**B1** **M1** **A1** **M1** **A1**	[5]
3	**(i)**	Rewrite integrand as $\sec^2 4x - 1$ Integrate to obtain $\frac{1}{4}\tan 4x - x$, condoning absence of $+c$	**B1** **B1**	[2]
	(ii)	Integrate to obtain $2\sin 2x - 2\cos 3x$ Apply limits correctly to integral of form $k_1 \sin 2x + k_2 \cos 3x$ Obtain $3 - \sqrt{2}$ or exact equivalent	**B1** **M1** **A1**	[3]
4	**(i)**	Substitute $x = \frac{1}{2}$ and equate to zero Obtain $a = 2$	**M1** **A1**	[2]
	(ii)	Divide by $2x - 1$ at least as far as $x^2 + kx$ Obtain quotient $x^2 + 2x + 5$ Calculate discriminant of 3-term quadratic expression or equivalent Obtain -16 and conclude appropriately	**M1** **A1** **M1** **A1**	[4]
	(iii)	Use logarithms with power law shown in solving $6^y = \frac{1}{2}$ Obtain -0.387	**M1** **A1**	[2]
5	**(i)**	State or imply correct ordinates $\sqrt{2}$, $\sqrt{1+e}$, $\sqrt{1+e^2}$ or decimal equivalents Use correct formula, or equivalent, correctly with $h = 3$ and three ordinates Obtain answer 12.25 with no errors seen	**B1** **M1** **A1**	[3]
	(ii)	Refer to top of each trapezium being above curve or equivalent	**B1**	[1]
	(iii)	State or imply volume is $\int \pi(1 + e^{\frac{1}{3}x})\,dx$ Integrate to obtain form $k_1 x + k_2 e^{\frac{1}{3}x}$ with or without π Obtain correct $\pi(x + 3e^{\frac{1}{3}x})$ or $x + 3e^{\frac{1}{3}x}$ Obtain $\pi(3 + 3e^2)$ or exact equivalent	**B1** **M1** **A1** **A1**	[4]

6	**(i)**	State $\frac{dx}{dt} = \frac{1}{t+1}$ Use product rule for derivative of y Obtain $2t\ln t + t$ or equivalent Use $\frac{dy}{dx} = \frac{dy}{dt} \div \frac{dx}{dt}$ Obtain $(t+1)(2t\ln t + t)$	**B1** **M1** **A1** **M1** **A1**	[5]
	(ii)	Solve $2\ln t + 1 = 0$ Obtain $t = e^{-\frac{1}{2}}$	**M1** **A1**	[2]
	(iii)	Identify $t = 1$ only Obtain 2	**B1** **B1**	[2]
7	**(i)**	State $\frac{3}{\cos\theta} + \frac{4}{\sin\theta}$ Use identity for $\sin 2\theta$ and obtain expression of form $a\sin\theta + b\cos\theta$ Obtain $6\sin\theta + 8\cos\theta$	**B1** **M1** **A1**	[3]
	(ii)	State $R = 10$, following their $a\sin\theta + b\cos\theta$ Use appropriate trigonometry to find α Obtain 53.1(3) with no errors seen	**B1**√ **M1** **A1**	[3]
	(iii)	Carry out correct process to find one angle between 0 and 360 Obtain 82.4 or 82.5 Carry out correct process to find second angle between 0 and 360 Obtain 351.3 and no others between 0 and 360	**M1** **A1** **M1** **A1**	[4]