1	Use identity to express integrand in the form $k_1 + k_2\cos 2x$
	Obtain correct $3-3\cos 2x$
	Integrate to obtain $3x - \frac{3}{2}\sin 2x$

5(a)	Attempt solution of $8e^{-\frac{1}{2}x} - 1 = 0$ with use of a relevant logarithm property
	Confirm $x = 6\ln 2$
	Alternative Method for Question 5(a)
	Substitute $x = 6\ln 2$ in $8e^{-\frac{1}{2}x} - 1$ and show use of a relevant logarithm property
	Obtain $8e^{-3\ln 2} - 1$ and hence $8e^{\ln\frac{1}{8}} - 1$ or equivalent and verify answer 0
5(b)	Integrate $8e^{-\frac{1}{2}x} - 1$ to obtain the form $ke^{-\frac{1}{2}x} - x$
	Obtain correct $-16e^{-\frac{1}{2}x} - x$
	Apply limits 0 and $6\ln 2$ to obtain $-16e^{-\frac{1}{2}\times 6\ln 2} - 6\ln 2 + 16$
	Attempt area of triangle minus area under curve
	Obtain $\frac{1}{2}\times 6\ln 2\times 7 - (14 - 6\ln 2)$ or equivalent, and hence $27\ln 2 - 14$

5(a)	Differentiate to obtain $-8\sin 2x + 8\cos x$
	Attempt to solve equation of form $k_1\sin 2x + k_2\cos x = 0$ using correct identity
	Obtain at least $\sin x = \frac{1}{2}$
	Attempt to find both coordinates of at least one maximum point
	Obtain $\left(\frac{1}{6}\pi,\ 6\right)$ and $\left(\frac{5}{6}\pi,\ 6\right)$ and no others between 0 and π
5(b)	Integrate to obtain expression of form $k_1\sin 2x + k_2\cos x$
	Obtain correct $2\sin 2x - 8\cos x$
	Apply *their* x-limits correctly to evaluate area under curve between A and B
	Obtain $6\sqrt{3}$ or exact unsimplified equivalent
	Carry out correct process to find area of shaded region
	Obtain $6\left(\frac{5}{6}\pi - \frac{1}{6}\pi\right) - 6\sqrt{3}$, and hence $4\pi - 6\sqrt{3}$

6(a)	Integrate to obtain expression of form $k_1e^{2x}+k_2e^{-x}$
	Obtain correct $\frac{1}{4}e^{2x}-\frac{1}{4}e^{-x}$
	Apply limits and arrange at least as far as $\frac{1}{2}e^{2a}=\ldots$ or $e^{2a}=\ldots$
	Confirm $a=\frac{1}{2}\ln(10+\frac{1}{2}e^{-a}+\frac{1}{2}e^{-4a})$
6(b)	Consider sign of $a-\frac{1}{2}\ln(10+\frac{1}{2}e^{-a}+\frac{1}{2}e^{-4a})$ or equivalent for values 1.0 and 1.2
	Obtain –0.16… and 0.041… or equivalents and justify conclusion
6(c)	Use iteration process correctly at least once
	Obtain final answer 1.159
	Show sufficient iterations to justify answer or show a sign change in the interval [1.1585, 1.1595]

4(a)	Differentiate to obtain $12e^{2x}-3e^{3x}$
	Attempt solution for x of equation of form $k_1e^{2x}+k_2e^{3x}=0$ (but not for $y=0$), to obtain $e^{\pm x}=k$
	Obtain $x=\ln 4$ or $x=2\ln 2$
4(b)	Identify $x=\ln 6$ as point where curve meets x-axis
	Integrate to obtain the form $k_3e^{2x}+k_4e^{3x}$
	Obtain $3e^{2x}-\frac{1}{3}e^{3x}$
	Apply limits to obtain answer $\frac{100}{3}$ only

7(a)	Use correct identities to express in terms of $\sin x$ and $\cos x$
	Obtain $4\sin^2 x\cos^2 x+4\cos^2 x(\cos^2 x-\sin^2 x)$
	Confirm $4\cos^4 x$
7(b)	Use identity from part **(a)** to obtain $k<5$ or $k>9$
	Obtain $k<5$, $k>9$
7(c)	State or imply integrand is $2\cos^2\frac{1}{2}t$ or $\sqrt{4\cos^4\frac{t}{2}}$
	Use double-angle identity to express in terms of $\cos t$
	Obtain $1+\cos t$ and integrate to obtain $t+\sin t$
	Use limits to obtain $\frac{2}{3}\pi+\sqrt{3}$

1	Integrate to obtain $2\ln(4x+1)$
	Apply limits correctly to $k\ln(4x+1)$ and use at least one relevant logarithm property
	Obtain $2\ln 45 - 2\ln 9 = 2\ln 5$ or equivalent, and conclude $\ln 25$

4(a)	State $4e^{-2x} = 1 + 0.5\sin 3x$ and confirm $x = -0.5\ln(0.25 + 0.125\sin 3x)$
4(b)	Use iterative process correctly at least once
	Obtain final answer 0.4912
	Show sufficient iterations to 6 significant figures to justify answer or show a sign change in the interval [0.49115, 0.49125]
4(c)	Integrate to obtain the form $k_1 e^{-2x} + k_2 x + k_3 \cos 3x$
	Obtain correct $-2e^{-2x} - x + \frac{1}{6}\cos 3x$
	Apply limits 0 and *their* part **(b)** answer correctly and attempt evaluation
	Obtain 0.61