1 Use power law for logarithms correctly at least once **M1**
Obtain $3x\log 5 = 4y\log 7$ or $3x\ln 5 = 4y\ln 7$ or equivalent **A1**
Obtain 1.612 **A1** [3]

2 **(i)** Carry out division, or equivalent, at least as far as quotient $2x+k$ **M1**
Obtain quotient $2x-3$ **A1**
Obtain remainder $-25x+18$ **A1** [3]

(ii) Subtract remainder of form $ax+b$ $(ab\neq 0)$ from $2x^3-7x^2-9x+3$ or multiply their quotient by x^2-2x+5 **M1**
Obtain $p=16$ and $q=-15$ **A1** [2]

3 **(i)** State or imply non-modular equation $(3u+1)^2=(2u-5)^2$ or corresponding pair of linear equations **B1**
Attempt solution of 3-term quadratic equation or of 2 linear equations **M1**
Obtain -6 and $\frac{4}{5}$ **A1** [3]

(ii) Evaluate $\tan^{-1}\frac{1}{k}$ for at least one of their solutions k from part **(i)** **M1**
Obtain 0.896 **A1** [2]

4 **(i)** State $\sin\theta\cos 60+\cos\theta\sin 60+\sin\theta\cos 120+\cos\theta\sin 120$ ***B1**
Use $\sin 60=\sin 120=\frac{1}{2}\sqrt{3}$ and $\cos 60=\frac{1}{2}$, $\cos 120=-\frac{1}{2}$ ***B1**
Confirm result $\sqrt{3}\cos\theta$, dependent on *B *B **DB1** [3]

(ii) **(a)** $\cos 45$ seen ***B1**
State $\sqrt{\frac{3}{2}}$ or $\frac{1}{2}\sqrt{6}$ or exact equivalent, dependent *B **DB1** [2]

(b) Carry out correct process to find at least one value of θ from $\cos^2\theta=k$ **M1**
Obtain 40.6 **A1**
Obtain 139.4 **A1** [3]

5 **(i)** Use product rule to obtain form $k_1e^{\frac{1}{3}x}+k_2xe^{\frac{1}{3}x}$ ***M1**
Obtain correct $6e^{\frac{1}{3}x}+2xe^{\frac{1}{3}x}$ **A1**
Equate first derivative to 40 and obtain equation without e present, dep *M **DM1**
Confirm $p=3\ln\frac{20}{p+3}$ or $x=3\ln\frac{20}{x+3}$ **A1** [4]

(ii) Consider sign of $p-3\ln\frac{20}{p+3}$ at 3.3 and 3.5 or equivalent **M1**
Complete argument correctly with appropriate calculations **A1** [2]

(iii) Carry out iterative process correctly at least once **M1**
Obtain final answer 3.412 **A1**
Show sufficient iterations to justify accuracy to 3 dp or show sign change in interval $(3.4115, 3.4125)$ **B1** [3]

6	**(a)**	Obtain integrand $2e^{-2x} + \frac{1}{2}e^{-x}$	**B1**	
		Obtain integral of form $k_1e^{-2x} + k_2e^{-x}$	**M1**	
		Obtain answer $-e^{-2x} - \frac{1}{2}e^{-x}$, condoning absence of $+c$	**A1**	[3]
	(b)	Integrate to obtain $\frac{1}{2}\ln(2x+5)$	**B1**	
		Show correct use of $p\ln k = \ln k^p$ law at least once	**M1**	
		Show correct use of $\ln m - \ln n = \ln \frac{m}{n}$ law	**M1**	
		Obtain $\ln \frac{5}{3}$	**A1**	[4]
	(c)	State or imply correct ordinates $\log 2, \log 5, \log 8$ or decimal equivalents	**B1**	
		Use correct formula, or equivalent, correctly with $h = 3$ and 3 ordinates	**M1**	
		Obtain answer 3.9 with no errors seen	**A1**	[3]
7	**(i)**	State $\frac{dx}{dt} = \sin t$ and $\frac{dy}{dt} = -6\sin 2t$	**B1**	
		Use $\sin 2t = 2\sin t \cos t$	**B1**	
		Form expression for $\frac{dy}{dx}$ in terms of t	**M1**	
		Confirm $-12\cos t$	**A1**	[4]
	(ii)	Identify $\frac{1}{2}\pi$ as value of t	**B1**	
		Obtain $(2, -2)$	**B1**	[2]
	(iii)	Identify $\cos 2t = -\frac{1}{3}$	**B1**	
		Attempt to find value of t (or of $\cos t$) for at least one of the two points	**M1**	
		Obtain 0.955 (or $\frac{1}{\sqrt{3}}$) or 2.186 (or $-\frac{1}{\sqrt{3}}$)	**A1**	
		Obtain $-\frac{12}{\sqrt{3}}$ or $-4\sqrt{3}$ or -6.93 and $\frac{12}{\sqrt{3}}$ or $4\sqrt{3}$ or 6.93	**A1**	[4]