Question	Answer	Marks	Partial Marks
7(c)(ii)	$\frac{x^3 \ln x}{6} + \frac{x^3}{18} + c$ oe, isw	**B3**	must have arbitrary constant **B2** for $\frac{x^3 \ln x}{6} + \frac{x^3}{18}$ or $\frac{x^3 \ln x}{6} + \frac{kx^3}{3} + c$, $k > 0$ nfww or **B1** for $\frac{1}{6}\int\left(3x^2 \ln x + x^2\right)\mathrm{d}x + \frac{1}{6}\int x^2\,\mathrm{d}x$ soi or $\frac{x^3 \ln x}{6} + \int \frac{x^2}{6}\mathrm{d}x$ soi or $\int\left(3x^2 \ln x\right)\mathrm{d}x = x^3 \ln x - \int x^2\,\mathrm{d}x$ soi or $\int\left(3x^2 \ln x\right)\mathrm{d}x = x^3 \ln x - \frac{x^3}{3}$ soi
8	$\frac{\mathrm{d}y}{\mathrm{d}x} = -\frac{1}{4}\sin\frac{x}{4}$	**M2**	**M1** for $\frac{\mathrm{d}y}{\mathrm{d}x} = k\sin\frac{x}{4}$, $k < 0$ or $k = \frac{1}{4}$
	$y = 0.5$	**B1**	
	$\left.\frac{\mathrm{d}y}{\mathrm{d}x}\right\|_{x=\frac{4\pi}{3}} = -\frac{1}{4} \times \frac{\sqrt{3}}{2}$ or $-\frac{\sqrt{3}}{8}$	**M1**	**FT** (*their k*) $\times \frac{\sqrt{3}}{2}$ providing at least **M1** awarded
	$[m_{\text{normal}} =] \frac{8}{\sqrt{3}}$ soi	**M1**	**FT** $\frac{-1}{\textit{their}\left.\frac{\mathrm{d}y}{\mathrm{d}x}\right\|_{x=\frac{4\pi}{3}}}$
	$y - 0.5 = \frac{8}{\sqrt{3}}\left(x - \frac{4\pi}{3}\right)$ oe	**A1**	**dep** on previous **M1**; must have exact values **FT** *their* m_{normal} and *their* 0.5 providing both are non-zero, exact values
	$\left(\frac{4\pi}{3} - \frac{\sqrt{3}}{16}, 0\right)$ or exact equivalent; mark final answer	**A1**	

Question	Answer	Marks	Partial Marks
9	$\int e^{\frac{t}{4}}\,dt = 4e^{\frac{t}{4}}(+c)$ and $\int \frac{16e}{t^2}dt = \frac{-16e}{t}(+c)$	**B3**	**B2** for either correct or **B1** for $\int e^{\frac{t}{4}}\,dt = ae^{\frac{t}{4}}(+c)$ where a is a constant, $a > 0$ or $\int \frac{16e}{t^2}dt = \frac{-b}{t}(+c)$ where b is a constant $b > 0$
	Correct plan: $\int_0^4 e^{\frac{t}{4}}\,dt + \int_4^k \frac{16e}{t^2}dt = 13.4$ soi	**M1**	
	Correct equation: $4e^1 - 4e^0 + \left(-\frac{16e}{k} + \frac{16e}{4}\right) = 13.4$ OR [When $t = 4$ $s = 4e - 4$ When $t = k$ $s = \frac{-16e}{k} + 8e - 4$ and] $13.4 = \frac{-16e}{k} + 8e - 4$	**A1**	**dep** on **B3**; implies **M1**
	$k = 10$ or awrt 10.0	**A1**	dep on all previous marks awarded
10	$\lambda\left(\mathbf{c} + \frac{2}{5}\mathbf{b}\right)$ isw	**B2**	**B1** for $\lambda(\mathbf{c} + k\mathbf{b})$ where $k \neq \frac{2}{5}$ or 1, $k > 0$
	$2\mathbf{c} + \mu(\mathbf{b} - \mathbf{c})$ isw or $\mu\mathbf{b} + (2 - \mu)\mathbf{c}$ isw or $\mathbf{c} + \mathbf{b} + (1 - \mu)(\mathbf{c} - \mathbf{b})$ isw	**B2**	**B1** for any of the following with $n > 0$ $2\mathbf{c} + \mu(\mathbf{b} - n\mathbf{c})$ or $n\mathbf{c} + \mu(\mathbf{b} - \mathbf{c})$ or $\mathbf{c} + \mathbf{b} + (1 - \mu)(n\mathbf{c} - \mathbf{b})$ or $n(\mathbf{c} + \mathbf{b}) + (1 - \mu)(\mathbf{c} - \mathbf{b})$
	Equates components at least once $\lambda = 2 - \mu$ or $\frac{2}{5}\lambda = \mu$ soi	**M1**	**FT** providing of equivalent forms e.g.: $\lambda(s\mathbf{c} + t\mathbf{b})$ and $x\mathbf{c} + \mu(y\mathbf{b} + z\,\mathbf{c})$ where s, t, x, y, z are scalars
	$\lambda = 2 - \mu$ **and** $\frac{2}{5}\lambda = \mu$ soi, nfww	**A1**	
	$\mu = \frac{4}{7}$ $\left[\lambda = \frac{10}{7}\right]$	**A1**	
	[$AE : EB$ =] 4 : 3 oe	**A1**	must have earned all previous marks