Question	Answer	Marks	Partial Marks
10	[When $x = 5$] $y = 9$	**B1**	
	$\frac{dy}{dx} = \frac{2}{3}(5x+2)^{-\frac{1}{3}} \times 5$ oe	**B2**	**B1** for $\frac{dy}{dx} = k(5x+2)^{-\frac{1}{3}}$, $k \neq \frac{10}{3}$
	$\left.\frac{dy}{dx}\right\|_{x=5} = \frac{10}{9}$	**B1**	**FT** *their* $\left.\frac{dy}{dx}\right\|_{x=5}$ providing previous **B1** awarded
	Equation of normal e.g. $y - \textit{their}9 = -\frac{1}{\textit{their}\frac{10}{9}}(x-5)$ oe, soi	**M1**	**FT** $\frac{-1}{\textit{their}\left.\frac{dy}{dx}\right\|_{x=5}}$ and *their y*-coordinate
	Eliminates one variable e.g. $11 - x - \textit{their}9 = -\frac{1}{\textit{their}\frac{10}{9}}(x-5)$	**M1**	**dep** on previous **M** mark
	For Q: $x = -25$, $y = 36$	**A2**	**A1** for each
	Coordinates of R: (35, –18) or $\left((10 - \textit{their}(-25)),\ (18 - \textit{their}36)\right)$	**B1**	**FT** *their* coordinates of Q
11(a)	$\left[\overrightarrow{OX} =\right]\ \ \mathbf{b} + \lambda\left(\frac{3}{4}\mathbf{a} - \mathbf{b}\right)$ oe or $\left[\overrightarrow{OX} =\right]\ \ \frac{3}{4}\mathbf{a} + (1-\lambda)\left(\mathbf{b} - \frac{3}{4}\mathbf{a}\right)$ oe	**3**	**B2** for $\overrightarrow{BN} = \frac{3}{4}\mathbf{a} - \mathbf{b}$ oe, soi or **B1** for $\overrightarrow{ON} = \frac{3}{4}\mathbf{a}$ oe, soi
11(b)	$\left[\overrightarrow{OX} =\right]\ \ \frac{1}{2}\mathbf{b} + \mu\left(\mathbf{a} - \frac{1}{2}\mathbf{b}\right)$ oe or $\left[\overrightarrow{OX} =\right]\ \ \mathbf{a} + (1-\mu)\left(\frac{1}{2}\mathbf{b} - \mathbf{a}\right)$ oe	**2**	**B1** for $\overrightarrow{MA} = \mathbf{a} - \frac{1}{2}\mathbf{b}$
11(c)	$\mathbf{b} + \lambda\left(\frac{3}{4}\mathbf{a} - \mathbf{b}\right) = \frac{1}{2}\mathbf{b} + \mu\left(\mathbf{a} - \frac{1}{2}\mathbf{b}\right)$ soi	**M1**	**FT** *their* answer to **(a)** in terms of **a**, **b** and λ and **(b)** in terms of **a**, **b** and μ
	$\frac{3}{4}\lambda = \mu$ or $1 - \lambda = \frac{1}{2} - \frac{1}{2}\mu$	**M1**	**FT** *their* answer to **(a)** in terms of **a**, **b** and λ and **(b)** in terms of **a**, **b** and μ
	$\frac{3}{4}\lambda = \mu$ and $1 - \lambda = \frac{1}{2} - \frac{1}{2}\mu$	**A1**	
	$\lambda = \frac{4}{5}$, $\mu = \frac{3}{5}$	**A1**	

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Question	Answer	Marks	Partial Marks
12(a)	$\frac{\mathrm{d}}{\mathrm{d}x}\left(\mathrm{e}^{3x+2}\right)=3\mathrm{e}^{3x+2}$ soi	**B1**	
	$\frac{\mathrm{d}y}{\mathrm{d}x}=x\times \textit{their}\left(3\mathrm{e}^{3x+2}\right)+[1]\mathrm{e}^{3x+2}$ oe, isw	**2**	**FT** *their* $3\mathrm{e}^{3x+2}$ **M1** for correct structure of product rule
12(b)	$\frac{1}{3}x\mathrm{e}^{3x+2}-\frac{1}{9}\mathrm{e}^{3x+2}+c$ oe, nfww	**4**	**B3** for $\int 3x\mathrm{e}^{3x+2}\mathrm{d}x=x\mathrm{e}^{3x+2}-\frac{1}{3}\mathrm{e}^{3x+2}$ $(+A)$ or better or **B2** for $\int 3x\mathrm{e}^{3x+2}\mathrm{d}x=x\mathrm{e}^{3x+2}-\int \mathrm{e}^{3x+2}\mathrm{d}x$ or better or $\frac{1}{3}\mathrm{e}^{3x+2}+\int 3x\mathrm{e}^{3x+2}\mathrm{d}x=x\mathrm{e}^{3x+2}$ or $\int x\mathrm{e}^{3x+2}\mathrm{d}x=\frac{x}{3}\mathrm{e}^{3x+2}+k\mathrm{e}^{3x+2}$ where $k=\frac{1}{9}$ or $-\frac{1}{3}$ or **B1** for $\int 3x\mathrm{e}^{3x+2}\mathrm{d}x=\int\left(3x\mathrm{e}^{3x+2}+\mathrm{e}^{3x+2}\right)\mathrm{d}x-\int \mathrm{e}^{3x+2}\mathrm{d}x$ or $\int \frac{\mathrm{d}y}{\mathrm{d}x}\mathrm{d}x=\int 3x\mathrm{e}^{3x+2}\mathrm{d}x+\int \mathrm{e}^{3x+2}\mathrm{d}x$ or better

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