Question	Answer	Marks	Guidance
11(a)	$\overrightarrow{OQ}=\mathbf{a}+\frac{1}{3}(\mathbf{b}-\mathbf{a})$ or $\overrightarrow{OQ}=\mathbf{b}+\frac{2}{3}(\mathbf{a}-\mathbf{b})$ $\left(\overrightarrow{OQ}=\frac{2}{3}\mathbf{a}+\frac{1}{3}\mathbf{b}\right)$	**2**	**M1** for attempt to use $\overrightarrow{OQ}=\mathbf{a}+k(\mathbf{b}-\mathbf{a})$ or $\overrightarrow{OQ}=\mathbf{b}+k(\mathbf{a}-\mathbf{b})$, where k can be positive or negative Allow unsimplified
	$\overrightarrow{PQ}=-\frac{3}{4}\mathbf{a}+their\ \overrightarrow{OQ}$	**M1**	
	$\overrightarrow{PQ}=-\frac{3}{4}\mathbf{a}+\frac{2}{3}\mathbf{a}+\frac{1}{3}\mathbf{b}$ $\left(\overrightarrow{PQ}=\frac{1}{3}\mathbf{b}-\frac{1}{12}\mathbf{a}\right)$	**A1**	Allow unsimplified
	$\overrightarrow{OP}=\frac{3}{4}\mathbf{a}$	**B1**	Allow anywhere
	$\overrightarrow{OR}=\frac{3}{4}\mathbf{a}+\mu\left(\frac{1}{3}\mathbf{b}-\frac{1}{12}\mathbf{a}\right)$ oe	**B1**	Must be simplified
	Alternative		
	$\overrightarrow{PQ}=\frac{1}{4}\mathbf{a}+\frac{1}{3}(\mathbf{b}-\mathbf{a})$ $\left(\overrightarrow{PQ}=\frac{1}{3}\mathbf{b}-\frac{1}{12}\mathbf{a}\right)$	**(4)**	**B1** for $\overrightarrow{PA}=\frac{1}{4}\mathbf{a}$ **M1** for $\overrightarrow{AQ}=\frac{1}{3}(\mathbf{b}-\mathbf{a})$, allow a sign error i.e. use of $(\mathbf{a}-\mathbf{b})$ **M1** for attempt to use $\overrightarrow{PQ}=their\frac{1}{4}\mathbf{a}+their\overrightarrow{AQ}$ Allow unsimplified
	$\overrightarrow{OP}=\frac{3}{4}\mathbf{a}$	**(B1)**	
	$\overrightarrow{OR}=\frac{3}{4}\mathbf{a}+\mu\left(\frac{1}{3}\mathbf{b}-\frac{1}{12}\mathbf{a}\right)$ or $\overrightarrow{OR}=\frac{3}{4}\mathbf{a}-\frac{\mu}{12}\mathbf{a}+\mu\left(\frac{1}{3}\mathbf{b}\right)$ or $\overrightarrow{OR}=\left(\frac{3}{4}-\frac{\mu}{12}\right)\mathbf{a}+\frac{\mu}{3}\mathbf{b}$	**(B1)**	Must be simplified

Question	Answer	Marks	Guidance
11(b)	$\lambda = \frac{1}{3}\mu$	**B1**	For equating **b** vectors
	$\frac{3}{4} - \frac{1}{12}\mu = 0$ oe	**B1**	For equating **a** vectors to zero
	$\mu = 9,\ \lambda = 3$	**B1**	
12	When $\frac{\mathrm{d}y}{\mathrm{d}x} = 0,\ x = \frac{2}{5}$	**B1**	Must come from first derivative and not the second derivative
	$(y =)\ \frac{3}{20}(5x-2)^{\frac{4}{3}}\ (+c)$	**2**	**M1** for $k(5x-2)^{\frac{4}{3}}$
	$\frac{32}{5} = \frac{3}{20}((5\times 2)-2)^{\frac{4}{3}} + c$ oe	**M1**	**Dep** for attempt to find c using *their* $k(5x-2)^{\frac{4}{3}}$
	$c = 4$	**A1**	Allow an unsimplified fraction
	Stationary point $\left(\frac{2}{5},\ 4\right)$	**B1**	**Dep** on first **B** mark

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