Question	Answer	Marks	Guidance
12(a)	$\left(\frac{dy}{dx}=\right)$ $\frac{(x-1)\times\frac{2}{3}\times 6x\left(3x^2-2\right)^{-\frac{1}{3}}-\left(3x^2-2\right)^{\frac{2}{3}}}{(x-1)^2}$ or $\left(\frac{dy}{dx}=\right)$ $(x-1)^{-1}\times\frac{2}{3}\times 6x\left(3x^2-2\right)^{-\frac{1}{3}}-(x-1)^{-2}\left(3x^2-2\right)^{\frac{2}{3}}$	**3**	**B1** for $\frac{2}{3}\times 6x\left(3x^2-2\right)^{-\frac{1}{3}}$ **M1** for differentiation of a quotient or product **A1** for all terms other than $\frac{2}{3}\times 6x\left(3x^2-2\right)^{-\frac{1}{3}}$ correct
	$\frac{\left(3x^2-2\right)^{-\frac{1}{3}}}{(x-1)^2}\left(x^2-4x+2\right)$	**2**	**M1 dep** for attempt to factorise, must be in the form $\frac{\left(3x^2-2\right)^{-\frac{1}{3}}}{(x-1)^2}\left[ax(x-1)-\left(3x^2-2\right)\right]$ **A1** all correct
12(b)	When $x=2, \frac{dy}{dx}=-\frac{2}{\sqrt[3]{10}}$ oe	**M1**	**Dep** on the differentiation **M** mark from part **(a)** For attempt to find the value of *their* $\frac{dy}{dx}$ when $x = 2$
	$-\frac{2}{\sqrt[3]{10}}p$ or $-0.928p$	**A1**	
13(a)	Midpoint (10, –9)	**B1**	
	Gradient of $l = -\frac{5}{3}$	**B1**	
	Equation of l: $y+9=-\frac{5}{3}(x-10)$ oe	**M1**	Must be using *their* perpendicular gradient and *their* mid-point
	$y = –4$	**A1**	

Question	Answer	Marks	Guidance
13(b)	Attempt to use *their R* and displacement vectors or Pythagoras to find *S*	**M1**	May be implied by one correct coordinate If Pythagoras is used: **M1** for an attempt to reach to a 3-term quadratic with one variable using *their* equation and *their* midpoint from **(a)** e.g. $34x^2 - 680x + 646 = 0$
	(1, 6)	**A1**	
	(19, –24)	**A1**	