Question	Answer	Marks	Guidance
5(a)	Attempt correct process for solving 3-term quadratic equation in $\sqrt{x}$	M1	Accept $8y^2 - 6y - 9 \rightarrow (2y-3)(4y+3)$, if $y = \sqrt{x}$ specified.
	Obtain at least $2\sqrt{x} - 3 = 0$ or equivalent	A1	Ignore $4\sqrt{x} + 3 = 0$. **SC B1** for $\sqrt{x} = \frac{3}{2}$ with no method shown for solving the 3-term quadratic.
	Conclude $x = \frac{9}{4}$ ignore $\frac{9}{16}$	A1	**SC B1** if no method shown for solving the 3-term quadratic.
	Alternative Method for Q5(a)		
	$3\sqrt{x} = 4x - \frac{9}{2} \rightarrow 16x^2 - 45x + \frac{81}{4}$ o.e and attempt correct process to solve	M1	
	Obtain $x = \frac{9}{4}$ or $\frac{9}{16}$	A1	**SC B1** if no method shown for solving the 3-term quadratic.
	$x = \frac{9}{4}$ ignore $\frac{9}{16}$	A1	**SC B1** if no method shown for solving the 3-term quadratic.
		3	

Question	Answer	Marks	Guidance
5(b)	Integrate to obtain form $k_1x^2 + k_2x^{\frac{3}{2}} + k_3x$ where $k_1k_2k_3 \neq 0$	**M1**	
	Obtain correct $2x^2 - 2x^{\frac{3}{2}} + x$ or equivalent	**A1**	Allow unsimplified.
	Substitute $x = 4$ and $y = 11$ to attempt value of c	**M1**	Dependent on at least 2 correct terms involving x.
	Obtain $y = 2x^2 - 2x^{\frac{3}{2}} + x - 9$	**A1**	Must be simplified. Allow 'f(x) ='. Allow y missing if y appears previously.
		4	

Question	Answer	Marks	Guidance
7(a)	Differentiate to obtain form $k_1(2x+1)^{-\frac{4}{3}}$	**M1**	
	Obtain correct $-8(2x+1)^{-\frac{4}{3}}$ or unsimplified equivalent	**A1**	
	Attempt equation of tangent at $\left(\frac{7}{2}, 6\right)$ with numerical gradient	**M1**	Gradient must come from a differentiated expression.
	Obtain $y = -\frac{1}{2}x + \frac{31}{4}$ or equivalent of requested form	**A1**	
		4	

Question	Answer	Marks	Guidance
7(b)	Integrate to obtain form $k_2(2x+1)^{\frac{2}{3}}$	**M1**	
	Obtain correct $9(2x+1)^{\frac{2}{3}}$ or unsimplified equivalent	**A1**	
	Use correct limits correctly to find area	**M1**	Substitute correct limits into an integrated expression. 36 – 9 minimum working required.
	Obtain 27	**A1**	**SC B1** if M1 A1 M0 scored.
		4	

Question	Answer	Marks	Guidance
7(a)	$-2\left(\left(x\pm p\right)^2\pm q\right)$ or $-2\left(x\pm p\right)^2\pm q$	**M1***	$p\neq 0$.
	$-2\left(\left(x-2\right)^2\pm q\right)$ or $-2\left(x-2\right)^2\pm q$	**DM1**	
	$-2\left(x-2\right)^2+19$ and (2, 19)	**A1**	Accept $x=2, y=19$ or 2, 19.
		3	

Question	Answer	Marks	Guidance
7(b)	**Method 1**		
	$[x=]\pm 1$	**B1***	Both x co-ordinates for the points of intersection.
	Subtract and attempt to integrate	**M1***	
	$\left[\int\left(-2x^2+2\right)\mathrm{d}x\right]-\frac{2}{3}x^3+2x$	**B1***	Both terms correct.
	$\left(-\frac{2}{3}+2\right)-\left(\frac{2}{3}-2\right)$	**M1**	Apply *their* limits, one positive and one negative, obtained from equating the line and the curve to their integrated expression.
	$=\frac{8}{3},\ 2\frac{2}{3}$	**DB1**	AWRT 2.67 WWW. Condone $\frac{-8}{3}\to\frac{8}{3}$. **SC B1** for mistaking triangle for trapezium leading to $\frac{11}{3}$, i.e. a total of 2/5.
	Method 2		
	$[x=]\pm 1$	**B1***	Both x co-ordinates for the points of intersection.
	Attempt to integrate and subtract	**M1***	The second integral can be replaced with what is clearly their area of a trapezium.
	$\left\{\frac{-2x^3}{3}+\frac{8}{2}x^2+11x\right\}[-]\left\{\frac{8}{2}x^2+9x\right\}$	**B1***	OE All terms correct. The second integral can be replaced by $\frac{1}{2}(1+17)\times 2$ OE.

Question	Answer	Marks	Guidance
7(b)	$\left\{\left(\frac{-2}{3}+4+11\right)-\left(\frac{2}{3}+4-11\right)\right\}$ [−] $\{(4+9)-(4-9)\}$	M1	Apply *their* limits, one positive and one negative, obtained from equating the line and the curve, to *their* integrated expressions. If the trapezium has been used, the second integral can be replaced by *their* 18.
	$=\frac{8}{3},\ 2\frac{2}{3}$	DB1	AWRT 2.67 WWW. Condone $\frac{-8}{3}\to\frac{8}{3}$. **SC B1** for mistaking triangle for trapezium leading to $\frac{11}{3}$, i.e. a total of 2/5.
	Method 3		
	$[x=]\pm1$	B1*	Both x co-ordinates for the points of intersection.
	Subtract and attempt to integrate	M1*	
	$-\frac{2}{3}(x-2)^3-\frac{8}{2}x^2+10x$	B1*	All terms correct.
	$\left(\frac{2}{3}-4+10\right)-(18-4-10)$	M1	Apply *their* limits, one positive and one negative, obtained from equating the line and the curve, to *their* integrated expression.
	$=\frac{8}{3},\ 2\frac{2}{3}$	DB1	AWRT 2.67 WWW.

Question	Answer	Marks	Guidance
7(b)	**Method 4**		
	$[x=]\pm 1$	**B1***	Both x co-ordinates for the points of intersection.
	Attempt to integrate and subtract	**M1***	The second integral can be replaced with what is clearly *their* area of a trapezium.
	$\left\{-\frac{2}{3}(x-2)^3+19x\right\}$ [−] $\left\{\frac{8}{2}x^2+9x\right\}$	**B1***	All terms correct. The second integral can be replaced with $\frac{1}{2}(1+17)\times 2$ OE.
	$\left\{\left(\frac{2}{3}+19\right)-(18-19)\right\}$ [−] $\left\{(4+9)-(4-9)\right\}$	**M1**	Apply *their* limits, one positive and one negative, obtained from equating the line and the curve, to *their* integrated expression. If the trapezium has been used the second integral can be replaced with *their* 18 OE.
	$=\frac{8}{3},\ 2\frac{2}{3}$	**DB1**	AWRT 2.67 WWW. Condone $\frac{-8}{3}\to\frac{8}{3}$. **SC B1** for mistaking triangle for trapezium leading to $\frac{11}{3}$, i.e. a total of 2/5.
		5	