Question	Answer	Marks	Partial Marks
4	$x=\dfrac{-\left(4-2\sqrt{7}\right)+\sqrt{\left(4-2\sqrt{7}\right)^2-4\left(5+4\sqrt{7}\right)(-1)}}{2\left(5+4\sqrt{7}\right)}$	**M1**	For correct use of quadratic formula, allow inclusion of ± until final answer
	$x=\dfrac{-\left(4-2\sqrt{7}\right)+\sqrt{16+28-16\sqrt{7}+20+16\sqrt{7}}}{2\left(5+4\sqrt{7}\right)}$ $x=\dfrac{-\left(4-2\sqrt{7}\right)+8}{2\left(5+4\sqrt{7}\right)}$	**M1**	For attempt to simplify discriminant, must see attempt at expansion and subsequent simplification
	$x=\dfrac{4+2\sqrt{7}}{2\left(5+4\sqrt{7}\right)}$ or $x=\dfrac{2+\sqrt{7}}{\left(5+4\sqrt{7}\right)}$	**A1**	For either
	$x=\dfrac{2+\sqrt{7}}{\left(5+4\sqrt{7}\right)}\times\dfrac{5-4\sqrt{7}}{5-4\sqrt{7}}$ $x=\dfrac{10+5\sqrt{7}-8\sqrt{7}-28}{25-112}$	**M1**	For attempt to rationalise, must see attempt at expansion and subsequent simplification
	$x=\dfrac{6}{29}+\dfrac{\sqrt{7}}{29}$	**A1**	
5	$\dfrac{\mathrm{d}y}{\mathrm{d}x}=\dfrac{(x+2)\dfrac{6x}{3x^2-1}-\ln\left(3x^2-1\right)}{(x+2)^2}$	**B1**	B1 for $\dfrac{6x}{3x^2-1}$
		M1	For attempt to differentiate a quotient or an equivalent product, must have correct order of terms and correct sign
		A1	
	When $x=1$, $y=\dfrac{\ln 2}{3}$ or $0.231(0)$	**B1**	
	When $x=1$, $\dfrac{\mathrm{d}y}{\mathrm{d}x}=0.92298$, allow 0.923	**B1**	
	$y=0.923x-0.692$	**B1**	
6(a)	$x(5x+6)=8$ $5x^2+6x-8=0$	**M1**	For attempt to equate and obtain a 3-term quadratic in either x or y
	$\left(\dfrac{4}{5},\ 10\right)$	**A1**	Allow A1 if only x-coordinates or only y-coordinates are given
	(–2, –4)	**A1**	

Question	Answer	Marks	Partial Marks
6(b)	Midpoint $\left(-\frac{3}{5},\ 3\right)$	**B1**	
	Gradient 5	**B1**	
	$y-3=-\frac{1}{5}\left(x+\frac{3}{5}\right)$	**M1**	Attempt at perp bisector using *their* midpoint and perp gradient
	$x-3=-\frac{1}{5}\left(x+\frac{3}{5}\right)$	**M1**	For use of $y=x$ and attempt to solve
	$\left(\frac{12}{5},\ \frac{12}{5}\right)$	**A1**	
7(a)	0.8	**B1**	
7(b)	Sector area = $\frac{1}{2}12^2(0.8)$ 57.6	**B1**	Allow unsimplified
	$\tan 0.4=\frac{AM}{12}$ $AM=12\tan 0.4$ 5.074	**M1**	Attempt at AM using *their* $\frac{\theta}{2}$ Allow unsimplified
	Area of triangle $=\frac{1}{2}(5.074\times 2)\times 12$ 60.88	**M1**	Area of triangle using *their AM*, allow unsimplified
	Shaded area 3.28	**A1**	
7(c)	$\sin 0.4=\frac{AM}{OA}$ $OA=\frac{5.074}{\sin 0.4}$ 13.03	**M1**	Attempt to find *OA* using *their* $\frac{\theta}{2}$ and *their AM*
	Perimeter $=2(1.03)+9.6+2(5.074)$	**M1**	Allow if using *their* $\frac{\theta}{2}$ and *their CM*
	Perimeter = 21.8	**A1**	
8(a)	$\frac{3(2x+3)+3(2x-3)}{4x^2-9}$	**M1**	Must see for M1
	$\frac{12x}{4x^2-9}$	**A1**	