Question	Scheme	Marks	AOs
15 (a)	$y=\dfrac{3x}{2}+32x^{-\frac{3}{2}} \Rightarrow \dfrac{dy}{dx}=\dfrac{3}{2}-48x^{-\frac{5}{2}}$	M1 A1	1.1b 1.1b
	Substitute $x=4 \Rightarrow \dfrac{dy}{dx}=\dfrac{3}{2}-48\times 4^{-\frac{5}{2}}$	M1	1.1b
	$\dfrac{dy}{dx}=\dfrac{3}{2}-48\times\dfrac{1}{32}=0 \Rightarrow$ stationary point at $x = 4$ *	A1*	2.1
		(4)	
(b)	$\displaystyle\int \frac{3x}{2}+32x^{-\frac{3}{2}}\,dx=\frac{3x^2}{4}-64x^{-\frac{1}{2}}$	M1 A1	1.1b 1.1b
	States or uses $y=10$ as the equation for l	B1	1.1b
	Area $R=\left[\dfrac{3x^2}{4}-64x^{-\frac{1}{2}}\right]_4^8-4\times y_{x=4}$	dM1	3.1a
	$= 28-16\sqrt{2}$	A1	1.1b
		(5)	
		(9 marks)	
Notes:			

(a)

M1: Attempts to differentiate. Look for either $\dfrac{3x}{2}\to\dfrac{3}{2}$ or $x^{-\frac{3}{2}}\to x^{-\frac{5}{2}}$

Condone unprocessed terms for this mark

A1: Correct differentiation. This may be left unsimplified

M1: Either substitutes $x=4$ into their $\dfrac{dy}{dx}$ and finds its value

Or alternatively attempts to solve $\dfrac{dy}{dx}=0$

A1*: Complete proof showing that the stationary point is at $x=4$

This requires (1) correct differentiation (2) correct calculations shown (see scheme) (3) reason given

(b)

M1: Attempts to integrate. Look for one correct index (which may be left unprocessed)

If they attempt $\int\left(y_1-y_2\right)dx$ where $y_2=$"10" just consider $\int y_1\,dx$

A1: Correct integration which may be left unsimplified. No requirement for + c

B1: States or uses $y=10$ as the equation for l. This is implied by sight of 4×10 in area calculation

dM1: Full method to find area for R.

See scheme but may also be scored for $\left[\frac{3x^{2}}{4} - 64x^{-\frac{1}{2}} - 10x\right]_4^8$

A1: $28 - 16\sqrt{2}$