Question	Scheme	Marks	AOs
3(a)	$y=4x-3x^{\frac{3}{2}}+13, \quad y=13-2x, \quad A(4,5)$		
	$y=4(4)-3(4)^{\frac{3}{2}}+13=5$ and $y=13-2(4)=5$	M1	1.1b
	The curve and the line intersect at $(4,5)$ *	A1*	2.1
		(2)	
(b)	$\int 4x-3x^{\frac{3}{2}}+13\,dx=2x^2-\frac{6}{5}x^{\frac{5}{2}}+13x\ (+c)$	M1 A1	1.1b 1.1b
	$\left[2x^2-\frac{6}{5}x^{\frac{5}{2}}+13x\right]_0^4-\frac{1}{2}\times4(13+5)$ $=\frac{228}{5}-36$	dM1	3.1a
	Area of $R=9.6$	A1	1.1b
		(4)	
	(b) Alternative		
	$\int 4x-3x^{\frac{3}{2}}+13-(13-2x)\,dx=3x^2-\frac{6}{5}x^{\frac{5}{2}}\ (+c)$	M1 A1	1.1b 1.1b
	$\left[3x^2-\frac{6}{5}x^{\frac{5}{2}}\right]_0^4=3(4)^2-\frac{6}{5}(4)^{\frac{5}{2}}\ (-0)$	dM1	3.1a
	Area of $R=9.6$	A1	1.1b
		(6 marks)	

Notes:

(a) M1: Attempts to substitute $x=4$ into both $y=4x-3x^{\frac{3}{2}}+13$ and $y=13-2x$.

Alternatively, sets $4x-3x^{\frac{3}{2}}+13=13-2x$, solves, and substitutes $x=4$ into either equation for *y*

A1*: Obtains $y=5$ for both and concludes that the curve and line intersect at $(4,5)$.

In the alternative, solves $4x-3x^{\frac{3}{2}}+13=13-2x$ using correct algebra to achieve $x=4$ and substitutes into either equation for *y* to achieve $y=5$ and concludes that the curve and line intersect at $(4,5)$.

(b)

M1: For an attempt to integrate $x^n \to x^{n+1}$ for *C* in at least one term.

A1: Correct integration.

dM1: For the key step in achieving a fully correct strategy for the area, e.g., attempts the trapezium and subtracts from the area enclosed between the curve, the *x*-axis, the *y*-axis and $x=4$.

(Condone the omission of the "– 0")

A1: 9.6 o.e. e.g., $\frac{48}{5}$

(b) Alternative

M1: For an attempt to integrate $x^n \to x^{n+1}$ for "$C - l$" in at least one term.

A1: Correct integration.

dM1: For the key step in achieving a fully correct strategy for the area. (Condone the omission of the "– 0")

A1: 9.6 o.e. e.g., $\frac{48}{5}$