Question	Scheme	Marks	AOs
14	$y = kx^2$ and $y = \sqrt{kx}$, $\quad x \geqslant 0$		
	E.g. • $kx^2 = \sqrt{kx} \Rightarrow k^2x^4 = kx \Rightarrow k^2x^4 - kx = 0 \Rightarrow kx(kx^3 - 1) = 0$ $\{\Rightarrow kx = 0 \Rightarrow x = 0\} \Rightarrow kx^3 - 1 = 0 \Rightarrow x^3 = \frac{1}{k} \Rightarrow x = \ldots$ • $kx^2 = \sqrt{kx} \Rightarrow k^2x^4 = kx \Rightarrow kx^3 = 1 \Rightarrow x = \ldots$ • $kx^2 = \sqrt{kx} \Rightarrow k^{\frac{1}{2}}x^{\frac{3}{2}} = 1 \Rightarrow x^{\frac{3}{2}} = k^{-\frac{1}{2}} \Rightarrow x = \ldots$	M1	2.1
	$x = \sqrt[3]{\frac{1}{k}}$ or $x = k^{-\frac{1}{3}}$	A1	1.1b
	$\text{Area}(R) = \int_0^{k^{-\frac{1}{3}}} \left(\sqrt{kx} - kx^2\right) \mathrm{d}x = \left[\frac{\sqrt{k}\,x^{\frac{3}{2}}}{\left(\frac{3}{2}\right)} - \frac{1}{3}kx^3\right]_0^{k^{-\frac{1}{3}}}$	M1	1.1b
		B1	1.1b
	$= \left(\frac{2}{3}\sqrt{k}\frac{1}{\sqrt{k}} - \frac{k}{3}.\frac{1}{k}\right) - (0 - 0) = \frac{2}{3} - \frac{1}{3} = \frac{1}{3}$ *	A1*	2.1
		(5)	
		(5 marks)	

Question 14 Notes:

M1:	Equates the two curves and solves $kx^2 = \sqrt{kx}$ to give $x = \ldots$
A1:	$x = \sqrt[3]{\frac{1}{k}}$ or $x = k^{-\frac{1}{3}}$
M1:	Evidence of attempting $\int\left(\sqrt{kx} - kx^2\right)\mathrm{d}x$ or $\left(\int\sqrt{kx}\,\mathrm{d}x - \int kx^2\,\mathrm{d}x\right)$ with at least one of either $\sqrt{kx} \to \pm\alpha x^{\frac{3}{2}}$ or $kx^2 \to \pm\beta x^3$; $\alpha, \beta \neq 0$. You can ignore the limits for this mark
B1:	At least one of either $\sqrt{kx} \to \frac{\sqrt{k}\,x^{\frac{3}{2}}}{\left(\frac{3}{2}\right)}$ or $kx^2 \to \frac{1}{3}kx^3$, which can be un-simplified or simplified
A1*:	Correct use of integration and limits to show that, for all values of k, the area of R is $\frac{1}{3}$