Question	Answer	Marks	Guidance
(a)	Quadratic curve, hence symmetrical	**B1**	OE. Allow sketch and 'symmetrical' or just 'curve symmetrical'
		1	
(b)	$-k\int_1^3 (x^2-4x+3)\mathrm{d}x = 1$	**M1**	Attempt to integrate f(x) and '= 1'. Ignore limits at this stage
	$-k\left[\frac{x^3}{3}-2x^2+3x\right]_1^3$	**A1**	Fully correct expression (correct integration and limits)
	$-k\times\left[0-\frac{4}{3}\right]=1 \quad \text{or} \quad k\times\frac{4}{3}=1$ $\left[k=\frac{3}{4}\right]$	**A1**	AG, OE. Correctly substitute limits and '= 1' and correctly obtain result with no errors seen.
		3	
(c)	$-\frac{3}{4}\int_1^3 \left(x^4-4x^3+3x^2\right)\mathrm{d}x$	**M1**	Attempt to integrate x^2 f(x) from 1 to 3
	$-\frac{3}{4}\times\left[\frac{x^5}{5}-x^4+x^3\right]_1^3$ $\left[=\frac{3}{4}\times\frac{28}{5}=\frac{21}{5}\right]$	**A1**	Correct integration and limits
	$\left[\frac{21}{5}-2^2\right]=0.2$	**A1**	
		3	

Question	Answer	Marks	Guidance
(d)	$-\frac{3}{4}\int_{2.5}^{3}\left(x^2-4x+3\right)\mathrm{d}x$	**M1**	OE. Attempt to integrate f(x), from 2.5 to 3 (or 1 to 2.5)
	$=-\frac{3}{4}\times\left[\frac{x^3}{3}-2x^2+3x\right]_{2.5}^{3}=\frac{5}{32}$ or 0.15625	**A1**	
	$1-\left(1-'\frac{5}{32}'\right)^3$	**M1**	OE. FT *their* $\frac{5}{32}$.
	= 0.399 (3 sf)	**A1**	
		4	