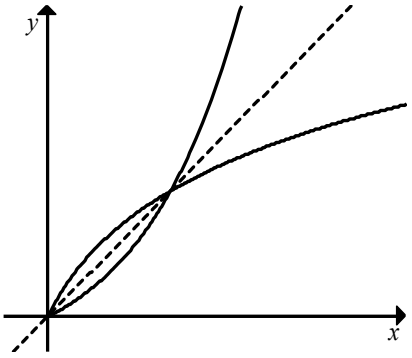
Question	Answer	Marks	Partial Marks
11(a)		**B3**	**B1** for correct shape of f or f^{-1} **B1** for symmetry **B1** for drawn over correct domain **Maximum of 2 marks if not fully correct**
11(b)(i)	$[\pm]\sqrt{x-1}=y-4$ soi	**M1**	
	$g^{-1}(x)=4-\sqrt{x-1}$	**A1**	
	[Range] $g^{-1} \leqslant 4$	**B1**	
	[Domain] $x \geqslant 1$	**B1**	
11(b)(ii)	$\ln(2[(x-4)^2+1]+1)$	**M1**	
	$\ln(2x^2-16x+35)$	**A1**	
11(b)(iii)	Valid explanation, e.g. some of the values in the range of f are outside the domain of g	**B1**	
12(a)	$\frac{\mathrm{d}\left(\mathrm{e}^{3x}\right)}{\mathrm{d}x}=3\mathrm{e}^{3x}$	**B1**	
	$\frac{\mathrm{d}(2x+3)^6}{\mathrm{d}x}=k(2x+3)^5$	**M1**	
	their $(3\mathrm{e}^{3x})\,(2x+3)^6+$ (e^{3x}) (*their* $12\,(2x+3)^5$)	**M1**	
	$(3\mathrm{e}^{3x})\,(2x+3)^6+(\mathrm{e}^{3x})\,(12\,(2x+3)^5)$	**A1**	
	$(3\mathrm{e}^{3x})\,(2x+3)^5(2x+7)=0$	**M1**	
	$x=-1.5, -3.5$	**A1**	
12(b)	$x=0.5 \quad f''(0.5)[=-5]<0 \Rightarrow$ max $x=3 \quad f''(3)[=5]>0 \Rightarrow$ min	**B2**	**B1** for either one correct

Question	Answer	Marks	Partial Marks
12(c)	$h = \frac{10}{x^2}$	**B1**	
	$S = 8x^2 + 10x\left(\textit{their}\ \frac{10}{x^2}\right)$	**B1**	
	$\frac{\mathrm{d}S}{\mathrm{d}x} = 16x - 100x^{-2}$ oe	**M1**	
	$16x - 100x^{-2} = 0,\ x = \sqrt[3]{\frac{25}{4}}$ oe	**A1**	**FT** *their* $\frac{\mathrm{d}S}{\mathrm{d}x} = 0$ if possible
	81.4 or 81.4325… rot to four or more figs	**A1**	

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