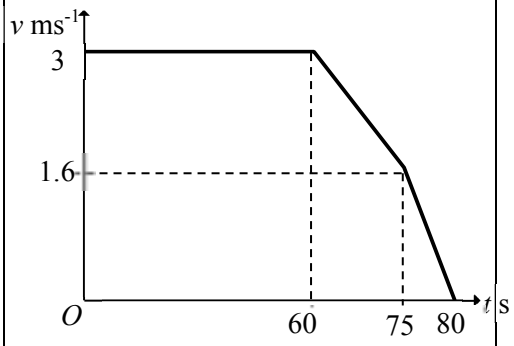
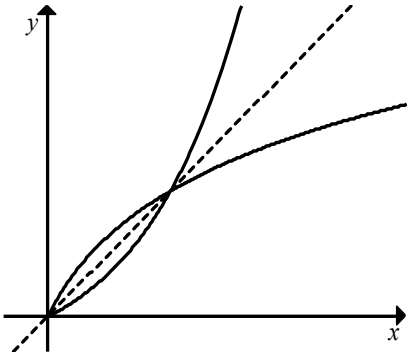
Question	Answer	Marks	Partial Marks
8(b)	Combines powers sufficiently to be able to take logs or applies correct log laws	**M1**	
	For making use of *their* expansion from part (a)	**M1**	
	$40x^2(2-x)$ [= 0] oe	**M1**	**FT** *their* (a) if possible
	$x = 0$, $x = 2$ cao	**A1**	
9(a)		**B3**	**B1** for correct shape with three distinct linear sections **B1** for 3 and 1.6 on vertical axis **B1** for 60, 75, 80 on horizontal axis
9(b)	$3 \times 60 + 15(1.6) + 0.5(15)(1.4) + 0.5(5)(1.6)$ or $3 \times 60 + 0.5(3 + 1.6)(15) + 0.5(5)(1.6)$	**M2**	**M1** for attempting at least two terms of the sum:
	218.5 (metres)	**A1**	
9(c)	0.32 (ms^{-2})	**B1**	
10(a)	$a = 3$, $b = 1$	**B2**	B1 for each
10(b)	$\int_0^{their\ b} 4x^{\frac{2}{3}}\,dx + \int_{their\ b}^{their\ a} (x-3)^2\,dx$	**M1**	
	$\left[\frac{3}{5} \times 4x^{\frac{5}{3}}\right]_0^{their\ b} + \left[\frac{(x-3)^3}{3}\right]_{their\ b}^{their\ a}$ soi	**M2**	M1 for each, soi
	$\frac{12}{5}(their\ b) - \frac{12}{5}(0) + \frac{(their\ a - 3)^3}{3} - \frac{(their\ b - 3)^3}{3}$	**M1**	
	$\frac{76}{15}$ or $5\frac{1}{15}$ or 5.07 or 5.06 rot to four or more figs; cao	**A1**	

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