Question number	Scheme	Marks
8	$s=\int\left(3+5t-2t^2\right)\,\mathrm{d}t=3t+\frac{5t^2}{2}-\frac{2t^3}{3}+c$	M1
	when $t=0$ $s=5$	
	$5=0+0-0+c$	B1
	$s=5+3t+\frac{5t^2}{2}-\frac{2t^3}{3}$	A1
	When $s=x$	
	$\frac{\mathrm{d}x}{\mathrm{d}t}=3+5t-2t^2=0\Rightarrow(2t+1)(t-3)=0\Rightarrow t=3$	M1A1
	$\Rightarrow x=5+3\times3+\frac{5\times3^2}{2}-\frac{2\times3^3}{3}=\frac{37}{2}$ oe	A1
	$\frac{\mathrm{d}^2x}{\mathrm{d}t^2}=5-4t$ when $t=3$ $\frac{\mathrm{d}^2x}{\mathrm{d}t^2}=-7\Rightarrow$ max	M1A1
		[8]
		Total 8 marks
M1	Attempt to integrate	
B1	$c=5$	
A1	$s=5+3t+\frac{5t^2}{2}-\frac{2t^3}{3}$	
M1	Solving $3+5t-2t^2=0$	
A1	$t=3$ if shown must reject $t=-\frac{1}{2}$	
A1	$x=\frac{37}{2}$ oe	
M1	Differentiates to obtain $\left(\frac{\mathrm{d}^2x}{\mathrm{d}t^2}=\right)5-4t$	
A1	Establish that the maximum has been obtained and give a conclusion	