Question Number	Scheme	Marks
1(a)	$\int k(3-t^2)\mathrm{d}t$	M1
	$= k(3t-\frac{1}{3}t^3) + (C)$	A1
	$t = 0, v = 0 \Rightarrow C = 0$ **and** $t = 1.5, v = 13.5$ **OR** $\left[k(3t-\frac{1}{3}t^3)\right]_0^{1.5} = 13.5$ $\Rightarrow k(3\times1.5-\frac{1}{3}\times1.5^3) = 13.5 \Rightarrow k = 4$*	A1*
		(3)
1(b)	$s = \int 4(3t-\frac{1}{3}t^3)\mathrm{d}t$	M1
	$s = 4(3\times\frac{1}{2}t^2-\frac{1}{3}\times\frac{1}{4}t^4) = \frac{1}{3}t^2(18-t^2)$ + D **and** $t = 0, s = 0 \Rightarrow D = 0$ **OR** $s = \left[4(3\times\frac{1}{2}t^2-\frac{1}{3}\times\frac{1}{4}t^4)\right]_0^t$ so $s = \frac{1}{3}t^2(18-t^2)$ * Accept any equivalent factorised form e.g. $s = \frac{(18-t^2)t^2}{3}$	A1*
		(2)
1(c)	$v = 0 \Rightarrow (k)(3t-\frac{1}{3}t^3) = 0$	M1
	$t = 3$	A1
	When $t = 3$, $s = 27$	M1
	Total distance = 54 (m)	A1
		(4)
	Notes for question 1	**(9)**
1(a)	M1 Integrate a wrt t, with both powers increasing by 1	
	A1 Correct integral	
	A1* $k = 4$ correctly obtained. $t = 0$ and $v = 0$ must be referred to but do not need to be actually substituted in. We must see the substitution of 1.5 and 13.5	
1(b)	M1 Integrate *their* v wrt t, with both powers increasing by 1, where v has come from a valid attempt at an integral of a. **N.B.** Allow without k being substituted.	
	A1* Given answer correctly obtained including "$s =$ " Must see reference to $t = 0$, $s = 0$ but do not need to be actually substituted in.	
1(c)	M1 Equate their v to 0 and solve for t	
	A1 cao	
	M1 Put their non-zero t, which must have come from $v = 0$, into s	

Question Number	Scheme	Marks
	A1 cao	
	N.B. $t = 3$ could come from a correct sketch of the graph of their v	