Question	Scheme	Marks
6(a)	$t=0 \Rightarrow s=\mathrm{e}^{2\times 0}\sin\left(3\times 0\right)+2=2$ $t=\dfrac{\pi}{6} \Rightarrow s=\mathrm{e}^{2\times\frac{\pi}{6}}\sin\left(3\times\dfrac{\pi}{6}\right)+2=\mathrm{e}^{\frac{\pi}{3}}+2$ $AB=\mathrm{e}^{\frac{\pi}{3}}+2-2=\mathrm{e}^{\frac{\pi}{3}}$ (m)	M1 A1 [2]
(b)	$v=2\mathrm{e}^{2t}\sin 3t+3\mathrm{e}^{2t}\cos 3t$ When $t=\dfrac{\pi}{3}$ $v=2\mathrm{e}^{\frac{2\pi}{3}}\sin\left(\dfrac{\pi}{3}\times 3\right)+3\mathrm{e}^{\frac{2\pi}{3}}\cos\left(\dfrac{\pi}{3}\times 3\right)=-3\mathrm{e}^{\frac{2\pi}{3}}$ (m/s)	M1A1A1 B1ft [4]
		Total 6 marks

Part	Mark	Notes
(a)	M1	For an attempt to find the displacements of A **and** B as simplified values. At least one must be correct and simplified for this mark and there must be an attempt at the other.
	A1	For finding the distance AB
(b)	M1	For an attempt at product rule. • The formula must be correct. i.e., $\left[v\right]=k\mathrm{e}^{2t}\times\sin 3t+\mathrm{e}^{2t}\times l\cos 3t$ • There must be an acceptable attempt to differentiate both e^{2t} and $\sin 3t$ $\mathrm{e}^{2t}\rightarrow k\mathrm{e}^{2t}$ and $\sin 3t\rightarrow l\cos 3t$ $k,l\neq 0$ and integers • The terms must be added.
	A1	One term fully correct.
	A1	Both terms fully correct.
	B1ft	For using $t=\dfrac{\pi}{3}$ in their v to find a value for v The minimally acceptable expression for v must be a **changed** expression from the given s in terms of e^{2x}, $\sin 3x$ and $\cos 3x$ Note: This is a ft mark. Please check their substitution and the final result. Please isw a value of $-24.36....$ if seen **together** with the exact value.