3a	Use $\mathbf{v}=\dfrac{\mathrm{d}\mathbf{r}}{\mathrm{d}t}$	M1	Differentiate the vector. At least 3 powers going down
	$\mathbf{v}=\left(3-(t+1)^{-\frac{1}{2}}\right)\mathbf{i}+(2t-6)\mathbf{j}$	A1 A1	one component correct both components correct.
	$(2t-6)=0\Rightarrow t=3$	M1	Equate their **j** component of velocity to zero and solve for t Must have seen a clear attempt to differentiate
	Speed = $2.5\left(\mathrm{m\,s^{-1}}\right)$ or equivalent	A1	Must be a scalar. A0 for 2.5**i**
		[5]	
3b	Use $\mathbf{a}=\dfrac{\mathrm{d}\mathbf{v}}{\mathrm{d}t}$	M1	Differentiate the vector. Powers going down and at least one constant goes to zero.
	$\mathbf{a}=\dfrac{1}{2}(t+1)^{-\frac{3}{2}}\mathbf{i}+2\mathbf{j}$	A1	Or equivalent correct expression Allow if correct derivative implied by correct substitution
	$\left(\mathbf{a}=\dfrac{4}{\sqrt{125}}\mathbf{i}+2\mathbf{j}\right)\ \lvert\mathbf{a}\rvert=\sqrt{\dfrac{16}{125}+2^2}$	DM1	Correct use of Pythagoras Dependent on the preceding M1
	$=2.03\left(\mathrm{m\,s^{-2}}\right)$ or better	A1	$\dfrac{2\sqrt{645}}{25}$ or 2.0317…
		[4]	
3c	For $\mathbf{r}=\mathbf{0}$, $\left(3t+2-2\sqrt{t+1}\right)=0$ and $\left(t^2-6t\right)=0$	M1	No need to consider $t=0$ as this is excluded in the Q
	$t\neq 0\Rightarrow t=6$ but $\left(3\times 6+2-2\sqrt{6+1}\right)\neq 0$ Hence no solution and does not return	A1	Clear explanation of the given result with no errors seen. e.g. $\left(3t+2-2\sqrt{t+1}\right)=0$ $\Rightarrow 9t^2+8t=0$ has no solution for $t>0$ (need something to indicate impossible)
	There will be other alternatives e.g. Show that the horizontal component of the velocity is always > 2, so no return M1 for correct strategy A1 for correct conclusion with no errors seen and sufficient justification. Conclusion needs to be clear but does not need to be the exact wording from the question. An argument dependent solely on acceleration is unlikely to work – do send to review if you find one worthy of merit.		
		[2]	
		(11)	