3(a)	Differentiate **r** w.r.t. t	M1
	$\left(\mathbf{v}=\frac{\mathrm{d}\mathbf{r}}{\mathrm{d}t}=\right)\quad\left(16-9t^2\right)\mathbf{i}+\left(3t^2-2t\right)\mathbf{j}$	A1
	Sets **i** component = 0: $16-9t^2=0$	M1
	$t=\frac{4}{3}\Rightarrow\mathbf{v}=\ldots$	dM1
	$\mathbf{v}=\left(3\times\frac{16}{9}-2\times\frac{4}{3}\right)\mathbf{j}=\frac{8}{3}\mathbf{j}$	A1
		(5)
3(b)	Differentiate **v** w.r.t. t	M1
	$\left(\mathbf{a}=\frac{\mathrm{d}\mathbf{v}}{\mathrm{d}t}=\right)\quad\left(-18t\right)\mathbf{i}+\left(6t-2\right)\mathbf{j}$	A1ft
	Substitutes $t = 4$ and finds magnitude	dM1
	$\lvert\mathbf{a}\rvert=\sqrt{72^2+22^2}=\sqrt{5668}=75$ (m s^{-2})	A1
		(4)
		(9 marks)

Notes (*N.B. Column vectors are acceptable throughout)*

(a) M1	Differentiates **r** w.r.t. t: at least one power decreasing by one in both **i** and **j** components.
A1	Correct vector
M1	Sets their **i** component equal to zero.
dM1	Solves for t **and** substitutes to find a velocity (or speed). Dependent on both previous M marks.
A1	Cao. Penalise extra solutions unless clearly discounted. Must be a vector. ISW if they go on to find a speed.
(b) M1	Differentiates **v** w.r.t. t: at least one power decreasing by one in both **i** and **j** components.
A1	Follow their **v** providing both **i** and **j** components are non-zero.
DM1	Substitutes $t = 4$ into their acceleration **and** uses Pythagoras' to find a magnitude. Dependent on previous M mark
A1	Cao. 75 or better (75.28612…) from correct working.