Question			Answer	Marks	AO	Guidance	
11	(a)		$\mathbf{v} = 6t^2\mathbf{i} + (10t - 4)\mathbf{j}$	B1	1.1	At least one term reduces in power by 1	
			$\mathbf{v} = 2.94\mathbf{i} + 3\mathbf{j}$			Substitution of $t = 0.7$, use	
			$90 - \tan^{-1}\left(\frac{2.94}{3}\right)$	M1	3.1a	$\tan^{-1}\left(\frac{y}{x}\right)$ and obtain $90 - 45.578 = 44.4^\circ$ to give a 3 figure bearing	For a complete method to find a bearing
			$= 044^\circ$	A1	1.1		
				[3]			
11	(b)		$\mathbf{a} = 12t\mathbf{i} + 10\mathbf{j}$	M1	1.1	Attempt differentiation of **v**	
			$\mathbf{a} = 8.4\mathbf{i} + 10\mathbf{j}$	A1	1.1	Substitute $t = 0.7$	
			Use $\mathbf{F} = m\mathbf{a}$ and use Pythagoras	M1	3.3		
			Obtain 1.57 N	A1FT	3.4	FT their **a** at t = 0.7	
				[4]			
11	(c)		$6t^2 = 10t - 4$	M1	2.2a	Equate **i** and **j** components and solve FT their **v** from part (i) if it leads to a quadratic	
			$6t^2 - 10t + 4 = 0$ so $t = 1$ or $\frac{2}{3}$			BC	
			E.g. **i** component always positive so both values are valid	E1	2.3	Must include comment on why equating components is sufficient in this case.	
				[2]			