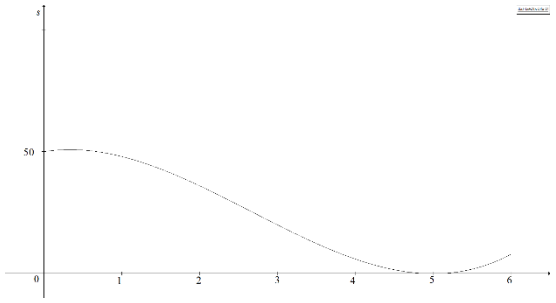
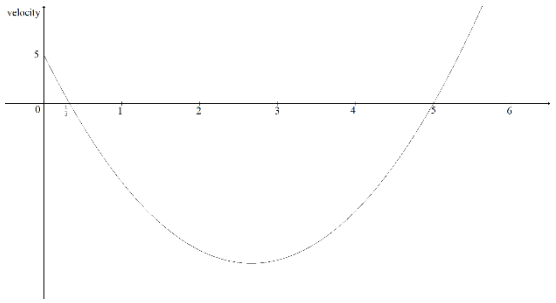
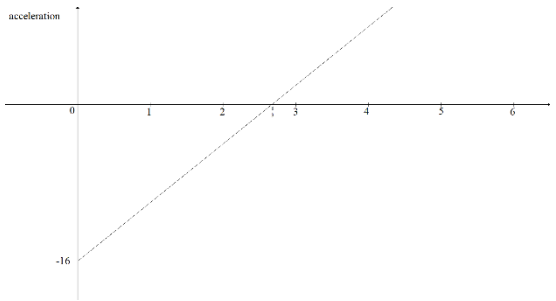
Question	Answer	Marks	Guidance
10(a)(i)	xy^2 soi	**B1**	Simplification of the left-hand side of the first equation
	$1 = \lg 10$ soi	**B1**	Simplification of right-hand side of equation
	$x - 3\left(\frac{10}{x}\right) = 13$	**M1**	For substitution of y^2 into linear equation oe and attempt to simplify
	$x^2 - 13x - 30 = 0$	**A1**	**AG** – must see sufficient detail to justify the given answer
	Alternative $y^2 = \frac{(x-13)}{3}$	**(B1)**	
	$\lg x + \lg \frac{(x-13)}{3} = 1$	**(M1)**	For attempt at substitution in the log equation
	$\frac{x(x-13)}{3} = 10$ oe	**(B1)**	
	$x^2 - 13x - 30 = 0$	**(A1)**	**AG** – must see sufficient detail to justify the given answer
10(a)(ii)	$x = 15$ only	**B1**	
	$y = \sqrt{\frac{2}{3}}$ or $\frac{\sqrt{6}}{3}$ or exact equivalent only	**B1**	isw once exact value seen
10(b)	$\log_a x + \frac{3}{\log_a x}$ or $\frac{1}{\log_x a} + 3\log_x a$	**B1**	For an appropriate change of base
	$(\log_a x)^2 - 4\log_a x + 3 = 0$ or $3(\log_x a)^2 - 4\log_x a + 1 = 0$	**M1**	For an attempt to obtain a 3-term quadratic equation in terms of $\log_a x$ or $\log_x a$, equated to zero.
	$\log_a x = 3 \quad \log_a x = 1$ or $\log_x a = \frac{1}{3}, \quad \log_x a = 1$	**M1**	**Dep** on previous **M** mark for correct solution of *their* quadratic equation
	$x = a$	**A1**	Must be from completely correct work
	$x = a^3$	**A1**	Must be from completely correct work

Question	Answer	Marks	Guidance
11(a)	$\frac{ds}{dt} = 3t^2 - 16t + 5$ oe	**2**	**M1** for attempt at differentiation of a product or expansion and differentiation with at least two out of three terms of *their* expansion differentiated correctly **A1** all correct, allow factorised
	$t = \frac{1}{3},\ t = 5$	**2**	**Dep M1** for attempt to solve *their* $\frac{ds}{dt} = 0$, must be in quadratic form **A1** for both
11(b)		**2**	**B1** for a correct curve in the first quadrant only. There must be an indication of a max point in the correct position and a min point at $(5,\ 0)$ **B1** for $(0,\ 50)$ provided basic curve shape is correct
11(c)		**2**	**B1** for a quadratic curve in the first and fourth quadrants **B1** for $(0,\ 5)$, $\left(\frac{1}{3},\ 0\right)$ or $(0.333,\ 0)$ marked and passing through $(5,\ 0)$ on the *x*-axis
11(d)(i)	Acceleration = $6t - 16$	**B1**	
11(d)(ii)		**2**	**B1** for a straight line with a positive gradient in the first and fourth quadrants, meeting the vertical axis **Dep B1** for $\left(\frac{8}{3},\ 0\right)$ or $(2.67,\ 0)$ and $(0,-16)$