Question	Answer	Marks	Partial marks
9(a)	Horizontal line, $v = 6$ for $0 \leqslant t \leqslant 5$	**B1**	
	Horizontal line, $v = -3$ for $5 \leqslant t \leqslant 15$	**B2**	**B1** for horizontal line for $5 \leqslant t \leqslant 15$ with $v = k$ where $k < 0$ or $v = 3$ for $5 \leqslant t \leqslant 15$ or $v = -3$ for $t > 5$ and at least $7 \leqslant t \leqslant 13$ If **0** scored, award: **SC2** for Horizontal line, $v = -6$ for $0 \leqslant t \leqslant 5$ **and** Horizontal line, $v = 3$ for $5 \leqslant t \leqslant 15$ **OR SC1** for Horizontal line, $v = -6$ for $0 \leqslant t \leqslant 5$ **and** Horizontal line for $5 \leqslant t \leqslant 15$ with $v = k$ where $k > 0$
9(b)	Single line with positive gradient passing through (0, –8), (10, 0) and (20, 8)	**B3**	**B2** for a single line with positive gradient • passing through a point indicated as (0, –8) or (20, 8) **and** the point (10, 0) • or passing through points indicated as (0, –8) and (20, 8) which does not pass through (10, 0) or **B1** for a single line with positive gradient • passing through a point indicated as (0, –8) or (20, 8) to or through any point on the t-axis • or passing through (10, 0) but with both endpoints incorrect or unlabelled If 0 scored, award **SC1** for a single line with negative gradient passing through (0, 8), (10, 0) and (20, –8)

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Question	Answer	Marks	Partial marks
10(a)	Maximum point at (2, 1) oe, nfww and $h = 5$ nfww	**B4**	**B3** for maximum point at (2, 1) oe or **B2** for maximum point when $x = 2$ or **B1** for a correct method which could be used to find the maximum point $\left[x\left(1-\frac{x}{4}\right)=0 \text{ when } x=0 \text{ and}\right] x = 4$ or [differentiating and equating to 0:] $1-\frac{2x}{4}=0$ or [completing the square to find:] $1-\frac{1}{4}(x-2)^2$ If 0 scored, **SC1** for $h = 5$ with incorrect or no method shown
10(b)	$x^2 - 4x - 16$ [= 0] oe or $-\frac{1}{4}(x-2)^2 = -4-1$ oe	**B1**	**FT** *their* attempt to complete the square, if already seen and of the form $a+b(x+c)^2$ where *a*, *b* and *c* are constants and *b* is negative
	Solves *their* 3-term quadratic using the formula or completing the square	**M1**	**FT** *their* rearrangement of $-4 = x - \frac{x^2}{4}$ oe
	$x = 2+2\sqrt{5}$ oe	**A1**	
10(c)	First derivative $1 - \frac{x}{2}$ and substitution of *their* $2+2\sqrt{5}$ or 6.47	**M1**	**FT** *their* attempt to differentiate $x-\frac{x^2}{4}$, if already seen, and *their* $2+2\sqrt{5}$
	$1 - 2\times\frac{2+2\sqrt{5}}{4}$ or $-\sqrt{5}$ or awrt –2.24 soi	**A1**	**dep** on correct derivative and correct *x*-coordinate of *A*
	Correct method to find the angle e.g. $-\tan^{-1}\left(1 - 2\times\frac{2+2\sqrt{5}}{4}\right)$ soi or $\tan^{-1}\sqrt{5}$ or $-\tan^{-1}(-\sqrt{5})$ soi	**M1**	**dep** on previous **M1 A1**
	Degrees: awrt 65.9 or Radians: awrt 1.15	**A1**	
11(a)	$x = 5$ $y = 5\sqrt{3}$	**B2**	**B1** for either component correct

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