January 2019
WFM01 Further Pure Mathematics F1
Mark Scheme

Question Number	Scheme	Notes	Marks
1.	$A(12, 12)$ lies on $y^2 = 12x$. l passes through A and S l meets the directrix of the parabola at B		
(a)	$\{a = 3 \Rightarrow S$ has coordinates$\}$ $(3, 0)$	**Either** states or uses $(3, 0)$ Can be implied by later work	B1
	Way 1 **Both** $m_l = \dfrac{12}{12 - "3"}$ **and either** • $y = \dfrac{12}{12-"3"}(x - "3")$ **or** • $0 = \dfrac{12}{12-"3"}("3") + c \Rightarrow y = \dfrac{12}{12-"3"}x +$ their c **or** • $12 = \dfrac{12}{12-"3"}(12) + c \Rightarrow y = \dfrac{12}{12-"3"}x +$ their c	**Way 1** Correct method for finding the gradient between their S and $(12, 12)$ **and** a correct method for finding the equation of l	M1
	Way 2 $\begin{cases} 3m + c = 0 \\ 12m + c = 12 \end{cases} \Rightarrow m = ..., c = ...$ and $y =$ (their m)$x +$ their c	**Way 2** Uses $y = mx + c$, their S and $(12, 12)$ to write two linear equations. Finds $m = ..., c = ...$ and writes $y =$ (their m)$x +$ their c	
	e.g. l: $y = \dfrac{12}{9}(x - 3)$, $y = \dfrac{4}{3}x - 4$, $y - 12 = \dfrac{12}{9}(x - 12)$, $4x - 3y - 12 = 0$ **or** $3y = 4x - 12$	Any correct form for the equation of l which can be simplified or un-simplified **Note: ignore subsequent working** following on from a correct answer seen	A1
	Note: At least one of either x_S or y_S must be correct in order to gain M1		**(3)**
(b)	{directrix has equation} $x = -3$	**Either** states or uses $x = -3$ **or** states or uses $x = -($their $a)$, $a > 0$ where a is the x-coordinate of their S	M1
	$y = \dfrac{12}{9}(-3 - 3)$ $\{= -8\}$	**dependent on the previous M1 mark** Substitutes $x = -3$ into their equation of l **or** substitutes $x = -a$, $a > 0$ where a is the x-coordinate of their S into their equation of l. **Note:** l must represent a line (and not a curve) for this mark to be awarded **Note:** This mark may be implied by their y-coordinate	dM1
	{coordinates of B are} $(-3, -8)$	$(-3, -8)$	A1
			(3)
			6

	Question 1 Notes	
1. (a)	**Note**	Give B0 for $a = 3$ by itself without reference to $(3, 0)$
	Note	Give B1 in part (a) for $S(3, 0)$ (and not $(3, 0)$) stated in part (b)
(b)	**Note**	Give 1st M1 for stating the x-coordinate of B as -3 or the x-coordinate of B as $-$(their a), $a > 0$ where a is the x-coordinate of their S E.g. Give 1st M1 for $B(-3, ...)$
	Note	Give A0 for $x = -3$, $y = -8$ without reference to $(-3, -8)$
	Note	Give A0 for $x = -3$, $y = -8$ followed by $(-8, -3)$
	Note	Give A0 if more than one set of coordinates are given for B
(a), (b)	**Note**	Give B1 for a sketch with either 3 or $(3, 0)$ marked on the x-axis
	Note	Give 1st M1 in part (b) for a sketch with a vertical line drawn at $x = -3$ with -3 indicated
	Note	Give 1st M1 in part (b) a statement "directrix is $x = -3$" seen anywhere