Question Number	Scheme	Notes	Marks
7(a) Way 1	$3x-4y+48=0 \Rightarrow x=\dfrac{4y-48}{3}$ $y^2=4ax \Rightarrow y^2=4a\left(\dfrac{4y-48}{3}\right)$ or $3x-4y+48=0 \Rightarrow y=\dfrac{3x+48}{4}$ $y^2=4ax \Rightarrow \left(\dfrac{3x+48}{4}\right)^2=4ax$ or $x=\dfrac{y^2}{4a} \Rightarrow \dfrac{3y^2}{4a}-4y+48=0$	Uses both equations to obtain an equation in one variable.	M1
	$3y^2-16ay+192a=0$ or $9x^2+(288-64a)x+2304=0$ or $3x-8\sqrt{a}\sqrt{x}+48=0$	Correct 3TQ (Coefficients could be 'fractional') (This could be a quadratic in $\sqrt{x}$)	A1
	Equal roots: $(16a)^2=4\times3\times192a$ or $(288-64a)^2=4\times9\times2304$ $\Rightarrow a=...$	Uses "$b^2=4ac$" to find a value for a	M1
	$a=9$ *	cso	A1*
	Beware the use of the given result $a=9$, but there may be cases where 'working backwards' deserves merit (if in doubt, send to Review).		
			(4)

(a) Way 2	$y^2 = 4ax \Rightarrow 2y\frac{dy}{dx} = 4a$ $3x - 4y + 48 = 0 \Rightarrow \frac{dy}{dx} = \frac{3}{4}$ $\Rightarrow 2y \times \frac{3}{4} = 4a$	Uses differentiation to obtain the gradient of C and substitutes the gradient of l to obtain an equation connecting y and a, or connecting x and a, or an equation in t	M1
	$y = 2a^{\frac{1}{2}}x^{\frac{1}{2}} \Rightarrow \frac{dy}{dx} = a^{\frac{1}{2}}x^{-\frac{1}{2}} \Rightarrow a^{\frac{1}{2}}x^{-\frac{1}{2}} = \frac{3}{4}$		
	$x = at^2,\ y = 2at \Rightarrow \frac{dy}{dx} = \frac{1}{t}$ $\frac{1}{t} = \frac{3}{4}$		
	$y = \frac{8a}{3}$ or $x = \frac{16a}{9}$	Correct y value, or correct x value (possibly implied in subsequent work, particularly if using the parametric equations)	A1
	$y^2 = 4ax \Rightarrow \frac{64a^2}{9} = 4ax \Rightarrow x = \frac{16a}{9}$ $3 \times \frac{16a}{9} - 4 \times \frac{8a}{3} + 48 = 0 \Rightarrow a = ...$	Uses $y^2 = 4ax$ or l to find a value for x (or y) and substitutes their x and y into the other equation to find a value for a If using parameter t, substitutes their value for t into $3(at^2) - 4(2at) + 48 = 0$ and solves to find a value for a	M1
	$x = \frac{4y - 48}{3} = \frac{32a}{9} - 16$ $\frac{64a^2}{9} = 4a\left(\frac{32a}{9} - 16\right) \Rightarrow a = \cdots$		
	$y^2 = 4ax \Rightarrow y^2 = \frac{64a^2}{9} \Rightarrow y = \frac{8a}{3}$ $3 \times \frac{16a}{9} - 4 \times \frac{8a}{3} + 48 = 0 \Rightarrow a = ...$		
	$y = \frac{3x + 48}{4} = \frac{4a}{3} + 12$ $\left(\frac{4a}{3} + 12\right)^2 = 4a\left(\frac{16a}{9}\right) \Rightarrow a = \cdots$		
	$3(at^2) - 4(2at) + 48 = 0$ $3\left(\frac{16a}{9}\right) - 4\left(\frac{8a}{3}\right) + 48 = 0 \Rightarrow a = \cdots$		
	$a = 9$ *	cso	A1*

(b)	$a=9 \Rightarrow 3y^2-144y+1728=0 \Rightarrow y=24$ $9x^2-288x+2304=0 \Rightarrow x=16$	Uses $a = 9$ to solve their 3TQ to obtain the repeated root for x or y.	M1
	$x = 16$ and $y = 24$	Correct values or coordinates.	A1
			(2)

(b) Way 2 follows (a)Way2	$a = 9 \Rightarrow x = \cdots$ or $y = \cdots$	Substitutes $a = 9$ into their expression for x or y, OR substitutes $a = 9$ into at^2 to find x , or into $2at$ to find y.	M1
	$x = 16$ and $y = 24$	Correct values or coordinates.	A1

(c) Way 1	Focus is at (9, 0)	Correct focus (could be seen on a sketch or implied in working)	B1
	$x=-9 \Rightarrow 3(-9)-4y+48=0 \Rightarrow y=5.25$	Correct method with the correct directrix to find the y coordinate of A	M1
	E.g.Trapezium – 2 triangles $=\frac{1}{2}\left(\frac{21}{4}+24\right)\times 25-\frac{1}{2}\times 18\times\frac{21}{4}-\frac{1}{2}\times 7\times 24=\frac{1875}{8}$ Fully correct triangle area method (condone one slip if the intention seems clear)		dM1
	$=\frac{1875}{8}(234.375)$	Correct area (exact)	A1
			(4)
			Total 10

(c) Way 2	Focus is at $(9,0)$	Correct focus (could be seen on a sketch or implied in working)	B1
	$x=9 \Rightarrow 3(9)-4y+48=0 \Rightarrow y=18.75$	Correct method to find the y coordinate when $x = 9$, but also requires correct directrix at some stage of the solution	M1
	E.g. $A=\frac{1}{2}(18.75\times 18)+\frac{1}{2}(18.75\times(16-9))$	Fully correct triangle area method (condone one slip if the intention seems clear)	dM1
	$=\frac{1875}{8}(234.375)$	Correct area (exact)	A1
(c) Way 3	Focus is at (9, 0)	Correct focus (could be seen on a sketch or implied in working)	B1
	$x=-9 \Rightarrow 3(-9)-4y+48=0 \Rightarrow y=5.25$	Correct method with the correct directrix to find the y coordinate of A	M1
	E.g. $\frac{1}{2}\begin{vmatrix}9 & -9 & 16 & 9\\ 0 & 5.25 & 24 & 0\end{vmatrix}$ $=\frac{1}{2}\lvert 47.25-216-84-216\rvert$	Fully correct area method (condone one slip if the intention seems clear)	dM1
	$=\frac{1875}{8}(234.375)$	Correct area (exact)	A1

(c) **Way 4**	Focus is at (9, 0)	Correct focus (could be seen on a sketch or implied in working)	B1
	$x=-9 \Rightarrow 3(-9)-4y+48=0 \Rightarrow y=5.25$	Correct method with the correct directrix to find the y coordinate of A	M1
	E.g.Rectangle – 3 triangles $(25\times 24)-\frac{1}{2}(18\times 5.25)-\frac{1}{2}(7\times 24)-\frac{1}{2}(25\times 18.75)$ Fully correct triangle area method (condone one slip if the intention seems clear)		dM1
	$=\frac{1875}{8}(234.375)$	Correct area (exact)	A1

