Question Number	Scheme	Marks
7 (a)	$\left(\frac{11}{3}, -4\right)$	B1 B1 **(2)**
(b)	Attempts $3x-11-4=8$ and $-3x+11-4=8$ $x=-\frac{1}{3}, \frac{23}{3}$	M1, dM1 A1 **(3)**
(c)	$m \geq 3, \quad m=-\frac{12}{11}, \quad m<-3$	M1, A1, A1 **(3)**
(d)	$a=-4, \ b=\frac{4}{3}$	B1ft, B1ft **(2)**
		(10 marks)

Note: Check working near to the question text or written on the diagram.

(a)

B1 For one correct coordinate

B1 For $\left(\frac{11}{3}, -4\right)$. Allow missing brackets, or $x=\frac{11}{3}, y=-4$. Accept equivalent fractions for $\frac{11}{3}$

(b)

M1 For a full attempt at either $3x-11-4=8$ or $-3x+11-4=8$. Must lead to a value for x.

dM1 Dependent on the first M1. For a full attempt at both $3x-11-4=8$ and $-3x+11-4=8$ leading to values for x.

A1 $x=-\frac{1}{3}, \frac{23}{3}$ only. If one of these has clearly been selected as a final answer and the other rejected, withhold this mark.

Alt

M1 Reaches $|3x-11|=12$, squares both sides and solves a quadratic equation. Must lead to a value for x.

dM1 Reaches two values for x following a valid method for solving their quadratic equation.

A1 $x=-\frac{1}{3}, \frac{23}{3}$. If one of these has clearly been selected as a final answer and the other rejected, withhold this mark.

(c)

M1 Finds any of the three critical values for m. This need not be presented as an inequality.

A1 Two of $m \geq 3, \quad m=-\frac{12}{11}, \quad m<-3$. Do not give this mark if there are contradictions, e.g. $m=-\frac{12}{11}, m>-\frac{12}{11}$ unless the correct answer is clearly indicated. Accept set notation.

A1 All three of $m \geq 3, \quad m=-\frac{12}{11}, \quad m<-3$ with no contradictions (see above). Accept set notation.

(d) **Note: If *a*=… and *b*=… are not stated, they could be embedded in $y=af\left(x-b\right)$. The stated values take precedence.**

B1ft Either $a=-4$ or $b=\frac{4}{3}$ but follow through on their vertex, so allow $a=\frac{16}{"-4"}$ or $b=5-"\frac{11}{3}"$

B1ft Both $a=-4$ and $b=\frac{4}{3}$ but follow through on their vertex, so allow $a=\frac{16}{"-4"}$ and $b=5-"\frac{11}{3}"$

Question Number	Scheme	Marks
8	$x = \mathrm{e}^{2\tan y} \Rightarrow \dfrac{\mathrm{d}x}{\mathrm{d}y} = \mathrm{e}^{2\tan y} \times 2\sec^2 y$	B1
	$\Rightarrow \dfrac{\mathrm{d}x}{\mathrm{d}y} = 2x\left(1+\tan^2 y\right) = 2x\left(1+\left(\dfrac{\ln x}{2}\right)^2\right)$	M1
	$\Rightarrow \dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{4}{2x\left(4+\left(\ln x\right)^2\right)}$	M1
	$\Rightarrow \dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{2}{x\left(4+\left(\ln x\right)^2\right)}$	A1
		(4) **(4 marks)**

Note: Condone incorrect notations for $\left(\ln x\right)^2$ such as $\ln x^2$ and $\ln^2 x$ in working, but not in the final answer.

B1 Correct expression for $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ as in scheme or in an equivalent form

The following two M marks require their $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ to be in the form $k\,\mathrm{e}^{2\tan y}\sec^2 y$.

M1 Either:

- Attempts the reciprocal of their $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ to form an expression for $\dfrac{\mathrm{d}y}{\mathrm{d}x}$; OR
- Uses $\sec^2 y = 1+\tan^2 y$ to get $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ in terms of x.

M1 Both:

- Attempts the reciprocal of their $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ to form an expression for $\dfrac{\mathrm{d}y}{\mathrm{d}x}$; AND
- Uses $\sec^2 y = 1+\tan^2 y$ to get $\dfrac{\mathrm{d}y}{\mathrm{d}x}$ in terms of x.

A1 $\dfrac{\mathrm{d}y}{\mathrm{d}x} = \dfrac{2}{x\left(4+\left(\ln x\right)^2\right)}$. Condone missing $\dfrac{\mathrm{d}y}{\mathrm{d}x}$ on LHS as long as it appears somewhere in working and it is clear that it refers to their final answer.

Alt for the two M marks using cos

The following two M marks require their $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ to be in the form $\dfrac{k\,\mathrm{e}^{2\tan y}}{\cos^2 y}$.

M1 Either:

- Attempts the reciprocal of their $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ to form an expression for $\dfrac{\mathrm{d}y}{\mathrm{d}x}$; OR
- Forms an expression for $\cos^2 y$ using a valid method and gets $\dfrac{\mathrm{d}x}{\mathrm{d}y}$ in terms of x.

M1 Both: