Question Number	Scheme	Notes	Marks
1(a)	$\frac{10x}{x-6}=2x+12\Rightarrow 10x=2x^2-72$ $x^2-5x-36=0\Rightarrow (x+4)(x-9)=0$ $\Rightarrow x=-4,\ 9$	M1: Cross multiplies, forms 3TQ and solves (usual rules) A1: Both correct values	**M1** **A1**
			(2)
(b)(i)	$-4<x<6,\quad x>9$	$a<x<6,\quad x>b$ with their $a<0$ and $b>6$	**B1ft**
(b)(ii)	$\frac{10x}{x-6}=-(2x+12)\Rightarrow$ $x^2+5x-36=0\Rightarrow x=-9,\ 4$	From a correct equation, cross multiplies, forms 3TQ and solves (usual rules)	**M1**
	$x<-9,\quad -4<x<4,\quad x>9$	M1: Correct regions $x<\alpha,\ \beta<x<\gamma,\quad x>\delta$ for their values with $\alpha<\beta<0<\gamma<\delta$ condoning any non-strict inequality signs and $x\neq 6$ A1: Fully correct range of values in any suitable notation	**M1** **A1**
			(4)
			Total 6

Additional Notes

(a)+(b) Answers only without an algebraic method will score M0, but the roots (product = −36, sum = ±5) are deducible from the simplified (leading coefficient 1) quadratic in this case, so accept correct answers (or allow sign error) following the correct simplified quadratic to imply the M. If an error means a quadratic does not have simple roots, a method must be shown to solve. However, allow answers following an application of the formula even if the simplification would seem to warrant a calculator.

(a)

M1: Alternative to cross multiply is putting over a common denominator of $x-6$ and forming a quadratic in the numerator, or multiplying through by $(x-6)^2$, expanding, gathering and then factoring out the $x-6$ to leave a quadratic. Method must be clear, solutions by calculator are not acceptable.

A1: Both correct values and no spurious extras.

(b) **Note on the grids (b)(ii) will appear as MAA but is being marked as MMA**

B1ft: Correct region following their values as long as they satisfy that one is less than 0 and the other greater than 6 to match the given sketch. Accept set notation or interval notation. Accept with "and" or "or" between but set notion must use union, not intersection.

M1: Must be attempting to solve the correct initial equation. Same notes as the M1 in part (a) apply.

M1: This mark is essentially for demonstrating they understand the shape of the region that is needed. They may draw on the sketch to help. The solutions to their quadratics will have to fit the indicated pattern but if the made sign errors such that they had −9 and 4 in (a) and −4 and 9 in (b) this mark is recoverable (they will have lost the A in (a) and B1ft in (b) already).

A1: Correct answer, allowing the similar recovery as noted above. Allow if scored from calculator solutions to the quadratic equation. (Same criteria.)

Note: Candidates can recover all the marks in (b)(ii) if they start again by squaring both sides, but algebra would have to be complete and non-calculator method.

$$(2x+12)^2>\left(\frac{10x}{x-6}\right)^2\Rightarrow 4\left((x-6)(x+6)\right)^2>100x^2\Rightarrow\left(x^2-36\right)^2-25x^2>0\Rightarrow x^4-72x^2+36^2-25x^2>0$$

$$\Rightarrow x^4-97x^2+4^2\times 9^2>0\Rightarrow\left(x^2-16\right)\left(x^2-81\right)>0\Rightarrow \text{CVs}x=\pm 4,\pm 9\Rightarrow -9<x,\ -4<x<4,x>9$$

Answers are not likely to be this concise and will probably not succeed in reaching the answers via non-calculator means.