Question Number	Scheme	Marks
1	$\frac{2}{x+3}<1-\frac{3}{x-2}$	
	CV's $x=-3, x=2$ seen anywhere (perhaps on a diagram)	B1
	$2(x+3)(x-2)^2<(x+3)^2(x-2)^2-3(x+3)^2(x-2)$ **OR** $\frac{2}{x+3}<\frac{x-5}{x-2}\Rightarrow 2(x+3)(x-2)^2<(x-5)(x+3)^2(x-2)$ **OR** $\frac{2}{x+3}<\frac{x-5}{x-2}\Rightarrow \frac{2}{x+3}-\frac{x-5}{x-2}\Rightarrow \frac{f(x)}{(x+3)(x-2)}<0$	M1
	$(x+3)(x-2)\left[2(x-2)-(x+3)(x-2)+3(x+3)\right]$ $\Rightarrow (x+3)(x-2)\left(-x^2+4x+11\right)\ (<0)$ **OR** $(x+3)(x-2)\left[2(x-2)-(x-5)(x+3)\right]$ $\Rightarrow (x+3)(x-2)\left(-x^2+4x+11\right)\ (<0)$ **OR** $\frac{2(x-2)-(x+3)(x-5)}{(x+3)(x-2)}\Rightarrow \frac{-x^2+4x+11}{(x+3)(x-2)}\ (<0)$ **OR** $x^4-3x^3-21x^2+13x+66\ (<0)$	M1
	$-x^2+4x+11=0\Rightarrow x=\ldots.(\text{usual rules})$	M1
	$x=2\pm\sqrt{15}$	A1
	$x<-3,\ 2-\sqrt{15}<x<2,\ x>2+\sqrt{15}$ **OR** $x\in(-\infty,-3)\cup\left(2-\sqrt{15},2\right)\cup\left(2+\sqrt{15},\infty\right)$	M1A1
		(7)
		Total 7

Notes

B1: CV's -3 **and** 2 seen anywhere, on a diagram or stated

M1: Attempts to multiply both sides by $(x+3)^2(x-2)^2$ - allow if one side correct **OR** combine terms on RHS with common denominator and multiply by $(x+3)^2(x-2)^2$ allow if one side correct **OR** combine fractions to a single fraction with common denominator. Allow with >, <, = etc between the terms.

M1: Factorises out $(x+3)(x-2)$ and makes progress towards a 3-term quadratic **OR** combines terms on the numerator and makes progress towards a 3-term quadratic **OR** multiplies out and combines all terms to obtain a 4-term quartic (terms must be collected) Allow sign errors only if they progress to a quartic. Allow with >, <, = etc between the terms.

M1: Correct attempt at solving **their** three-term quadratic factor (usual rules) or their quartic- may be solved on a calculator, but if incorrect solutions for their equation, then method needed to gain this mark. Allow with >, <, = etc between the terms.

A1: Correct solutions obtained from correct quadratic/quartic and condone decimal equivalents for this mark (awrt 5.87 and awrt -1.87)

M1: Obtains the correct form for the solution using their CV's (condoning strict/non-strict inequalities) $x < a$, $b < x < c$, $x > d$ with $a < b < c < d$

A1: All three correct in exact form (not decimals) and no extras and must have all inequality signs correct.

Allow equivalent notations e.g. soft brackets for intervals. Ignore any word between the regions but withhold this last mark if $\cap$ used with set notation. **Allow non-strict inequalities to score for all but the final mark**. **Allow recovery from non-strict to strict if the final solution set is fully correct.**

Note

Multiplication of the inequality by $(x+3)(x-2)$ only can gain max B1M0M0M1A1M1A0

BUT setting the equations equal and then multiplying by $(x+3)(x-2)$ to find the POIs can score full marks if the correct values and inequality solution are found.