Question Number	Scheme	Marks
1	Assume there are positive numbers *a* and *b* such that $\frac{9a}{b}+\frac{4b}{a}<12$	B1
	Multiplies by $ab \Rightarrow 9a^2+4b^2<12ab$	M1
	$\Rightarrow 9a^2-12ab+4b^2<0 \Rightarrow (3a-2b)^2<0$	A1
	Square numbers cannot be negative, so we have a contradiction and hence, if *a* and *b* are positive real numbers, then $\frac{9a}{b}+\frac{4b}{a}\geq 12$	A1*
		(4 marks)

Condone $\leq$ for < for the first 3 marks in this question

B1: Sets up the argument. It requires the following three aspects

- Words such as 'assume' or 'let'
- 'positive (real) numbers *a* and *b*' or equivalent such as $a>0$ and $b>0$
- $\frac{9a}{b}+\frac{4b}{a}<12$ but condone $\frac{9a}{b}+\frac{4b}{a}\leq 12$

M1: Multiplies $\frac{9a}{b}+\frac{4b}{a}\ldots 12$ by *ab* to reach $9a^2+4b^2\ldots 12ab$ or $9a^2-12ab+4b^2\ldots 0$ where … can be = or any inequality.

Alternatives exist so $\frac{9a^2-12ab+4b^2}{ab}\ldots 0$, $\frac{9a^2+4b^2}{ab}\ldots 12$ and $9\left(\frac{a}{b}\right)^2-12\left(\frac{a}{b}\right)+4\ldots 0$ are all valid methods

A1: Reaches a point at which the contradiction can be proven. Examples of suitable alternatives include

$9a^2-12ab+4b^2<0 \Rightarrow (3a-2b)^2<0$, $\frac{9a^2-12ab+4b^2}{ab}<0 \Rightarrow \frac{(3a-2b)^2}{ab}<0$ or $9\left(\frac{a}{b}\right)^2-12\left(\frac{a}{b}\right)+4<0 \Rightarrow \left(\frac{3a}{b}-2\right)^2<0$ but condone attempts with ≤ instead of <

A1*: CSO. Fully correct proof with reason and conclusion.

Look for all of the following

- A correct set up
- correct algebra leading to $(3a-2b)^2<0$ o.e. NOT $(3a-2b)^2\leq 0$