Question	Scheme	Marks	AOs
2(a)	$\mathrm{f}(2)=3(2)^3-7(2)^2+7(2)-10=\ldots$	M1	1.1b
	$\mathrm{f}(2)=38-38=0\Rightarrow(x-2)$ is a factor of $\mathrm{f}(x)$ *	A1*	2.1
		(2)	
(b)	$a=3$ or $c=5$	B1	2.2a
	$\mathrm{f}(x)=(x-2)(\ldots x^2+\ldots x+\ldots)$	M1	1.1b
	$a=3,\ b=-1,\ c=5$	A1	1.1b
		(3)	
(c)	$3x^2-x+5=0\Rightarrow b^2-4ac=(-1)^2-4(3)(5)=\ldots$ or e.g. $3x^2-x+5=0\Rightarrow 3\left(x^2-\frac{1}{3}x+\frac{5}{3}\right)=0\Rightarrow\left(x-\frac{1}{6}\right)^2-\frac{1}{36}+\frac{5}{3}\Rightarrow\left(x-\frac{1}{6}\right)^2=\ldots$ or e.g. $\frac{\mathrm{d}y}{\mathrm{d}x}=6x-1=0\Rightarrow x=\ldots,\Rightarrow y=\ldots$	M1	3.1a
	$(-1)^2-4(3)(5)=-59\Rightarrow b^2-4ac<0$ or e.g. $\left(x-\frac{1}{6}\right)^2=-\frac{59}{36}$ and square numbers cannot be negative or e.g. $\frac{\mathrm{d}y}{\mathrm{d}x}=0\Rightarrow y=\frac{59}{12}$ so the minimum is above the x-axis So the quadratic has no real roots and so $\mathrm{f}(x)=0$ has only 1 real root	A1	2.4
		(2)	
			(7 marks)

Notes

(a)
M1: Attempts $\mathrm{f}(2)$
A1*: Clearly shows $\mathrm{f}(2)=0$ and makes a suitable conclusion
(b)
B1: Deduces the correct value of a or c
M1: Complete method to obtain values for a, b and c. May use inspection or expand to give $ax^3+(b-2a)x^2+(c-2b)x-2c$ and compare coefficients.
A1: All correct stated or embedded
(c)
M1: Starts the process of showing that their 3-term quadratic has no real roots. E.g. considers discriminant or attempts to solve by completing the square or differentiates to find turning point
A1: Fully correct work with appropriate conclusion for their chosen method