Q	Marking Instructions	AO	Marks	Typical Solution
9(a)	Multiplies out $\mathrm{f}(x)$ correctly	1.1b	B1	$\mathrm{f}(x) = (x-2)(x^2-6x+9)$ $= x^3 - 8x^2 + 21x - 18$
	Differentiates, with at least one term of $3x^2 - 16x + 21$ correct	1.1a	M1	
	Explains that $\mathrm{f}'(x) = 0$ for a turning point	2.4	E1	$\mathrm{f}'(x) = 3x^2 - 16x + 21$
	Sets 'their' differential equal to zero and solves to find 'their' two x values PI	1.1a	M1	$\mathrm{f}'(x) = 0$ for a turning point $3x^2 - 16x + 21 = 0$
	Obtains correct x coordinates of turning points	1.1b	A1	$x = \frac{7}{3}$ and 3
	Substitutes 'their' x values into $\mathrm{f}(x)$ to obtain 'their' y values	1.1a	M1	$y = \frac{4}{27}$ and 0
	Differentiates a second time, using 'their' $\mathrm{f}'(x)$ and tests each of the x coordinates of 'their' turning points or Tests the gradient either side of each value or Justifies fully from shape of cubic with reference to a sketch or using the nature of a positive cubic graph	1.1a	M1	$\mathrm{f}''(x) = 6x - 16$ $\mathrm{f}''\left(\frac{7}{3}\right) = -2 < 0$ $\mathrm{f}''(3) = 2 > 0$ Maximum at $\left(\frac{7}{3}, \frac{4}{27}\right)$ Minimum at $(3, 0)$
	Determines correct nature of turning points at the correct coordinates, clearly identifying which is maximum and which is minimum It is not necessary to obtain E1 to obtain R1	2.1	R1	
9(b)	Deduces at least one fully correct coordinate FT 'their' coordinates	2.2a	B1F	$\left(\frac{4}{3}, -\frac{104}{27}\right)$
	Deduces both coordinates correctly CSO	2.2a	B1	(2, -4)
	Total		**10**	