

Q	Marking Instructions	AO	Marks	Typical Solution
6(a)	Substitutes $x = 2$ into function	1.1a	M1	$f(2) = 2^3 - 2^2 + 2 - 6$
	Completes reasoned argument to explain that $f(2) = 0$ shows $(x - 2)$ is a factor	2.1	R1	$f(2) = 0$ which shows that $(x - 2)$ is a factor
Subtotal			2	
6(b)	Obtains correct factor	1.1b	B1	$x^2 + x + 3$
Subtotal			1	
6(c)	Calculates discriminant for their quadratic OE	3.1a	M1	$x^2 + x + 3 = 0$
	States that there are no real solutions from the quadratic	2.1	A1	Discriminant = $1^2 - 4 \times 1 \times 3$ $= -11 < 0$
	Deduces that there is only one solution coming from factor $(x - 2)$	2.2a	B1	So no real solutions to the quadratic Therefore $x = 2$ is the only solution
Subtotal			3	
6(d)	Expresses equation as a cubic in a single different variable or in terms of e^x $(e^x)^3 - (e^x)^2 + (e^x) - 6 = 0$	3.1a	M1	$y^3 - y^2 + y - 6 = 0$ where $y = e^x$
	Obtains solution $e^x = 2$	1.1b	A1	Solution $y = 2$ $e^x = 2$
	Obtains $\ln 2$. ISW	1.1b	A1	$x = \ln 2$
Subtotal			3	
Question Total			9	