Question			Answer	Marks	AO	Guidance	
9	(a)		$f'(x) = 3x^2 - 2x - 5$	B1	1.1		
			$x_{n+1} = x_n - \dfrac{{x_n}^3 - {x_n}^2 - 5x_n + 10}{3{x_n}^2 - 2x_n - 5}$	M1	1.1	Substitute into correct formula for Newton-Raphson	
			$x_{n+1} = \dfrac{3{x_n}^3 - 2{x_n}^2 - 5x_n - ({x_n}^3 - {x_n}^2 - 5x_n + 10)}{3{x_n}^2 - 2x_n - 5} =$ $= \dfrac{2{x_n}^3 - {x_n}^2 - 10}{3{x_n}^2 - 2x_n - 5}$	E1	2.1	AG a correct intermediate step leading to the given answer is required	
				[3]			
9	(b)		$x_2 = -2.607$ $x_3 = -2.535$ $x_4 = -2.533$	B1	1.1	BC All three values must be given to 4 significant figures.	
				[1]			
9	(c)		$f(-2.5325)$ and $f(-2.5335)$	M1	1.1	Accept other alternative values which would confirm α as a root correct to 4 s.f.	
			$(-2.5325)^3 - (-2.5325)^2 - 5(-2.5325) + 10 =$ 0.0066125 $(-2.5335)^3 - (-2.5335)^2 - 5(-2.5335) + 10 =$ –0.0127017	A1	2.1	At least the result of evaluation must be shown	
			Since $f(-2.5325) > 0$ and $f(-2.5335) < 0$ x_4 is α to 4 s.f.	E1	2.4	The change of sign must be pointed to	
				[3]			
9	(d)		$3(-1)^2 - 2(-1) - 5 = 0$	B1	2.1		
			Since the fraction is undefined at $x = -1$, x_2 is undefined	E1	1.2	Accept references to a stationary point of the function	or the tangent to the curve being horizontal
				[2]			