

Question		Answer	Marks	AO	Guidance
11	(a)	DR $f(x) = (x + 2)(x - 1)(x - 6)$	M1	1.1a	Attempt to factorise the quadratic factor or solve the equation $x^2 - 7x + 6 = 0$ algebraically
		$x = 1, 6$	A1	1.1	Must follow algebraic method
		$x = -2$	B1	1.1	Allow if seen
			[3]		
11	(b)	DR $y = x^3 - 5x^2 - 8x + 12$	M1	2.1	Differentiating their expanded $f(x)$
		$\frac{dy}{dx} = 3x^2 - 10x - 8$			
		When $x = 4$, $\frac{dy}{dx} = 48 - 40 - 8 = 0$ so stationary point	M1	2.2a	Substitution seen to give zero Also allow evidence of solving their $\frac{dy}{dx} = 0$ (eg factors, formula or both roots seen) Also allow for max or min stated
		$\frac{d^2y}{dx^2} = 6x - 10$	M1	2.1	Attempt to differentiate their first derivative
		When $x = 4$, $\frac{d^2y}{dx^2} [= 14] > 0$ so minimum point	A1	2.2a	Draw a correct conclusion from correct value
		Alternative method			
		When $x = 3$, $\frac{dy}{dx} = -11$ When $x = 5$, $\frac{dy}{dx} = 17$ Gradient changes from negative to positive so minimum point	M1 A1		Evaluates gradient for points $-\frac{2}{3} < x < 4$ and for $x > 4$ Draw a correct conclusion from correct values
			[4]		

Question		Answer	Marks	AO	Guidance
11	(c)	DR			
		Solving $\frac{dy}{dx} = 3x^2 - 10x - 8 = 0$	B1	1.1	Correct exact x -coordinate found.
		gives $x = -\frac{2}{3}$			
		$y = \frac{400}{27}$	B1	1.1	Exact y -coordinate found.
					Allow for only for fraction or recurring decimal $14.\dot{8}1\dot{4}$
			[2]		