Q	Marking instructions	AO	Marks	Typical solution
7(a)	Substitutes $x = -5$ and $y = 37$ into $y = x^3 + px^2 + qx + 12$ PI $37 = -125 + 25p - 5q + 12$	3.1a	M1	$37 = (-5)^3 + (-5)^2 p + (-5)q + 12$ $37 = -125 + 25p - 5q + 12$ $150 = 25p - 5q$ $5p - q = 30$
	Completes reasoned argument to show $5p - q = 30$ There must be at least one intermediate step after $(-5)^3$ and $(-5)^2$ evaluated AG	2.1	R1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)	Differentiates x^3 and 12 correctly	1.1b	B1	$\frac{dy}{dx} = 3x^2 + 2px + q$ $0 = 3 \times (-5)^2 - 10p + q$ $10p - q = 75$
	Differentiates px^2 correctly or differentiates qx correctly **and** equates their $\frac{dy}{dx}$ to zero	3.1a	M1	
	Completes reasoned argument by substituting $x = -5$ into a correct $\frac{dy}{dx}$ to obtain $10p - q = 75$ AG	2.1	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
7(c)	Obtains $p = 9, q = 15$	1.1b	B1	$5p - q = 30$ $10p - q = 75$ $p = 9, q = 15$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
7(d)	Solves $3x^2 + 2px + q\ (= 0)$ for their p and q Condone $x^2 + 2px + q\ (= 0)$	3.1a	M1	Stationary points occur when $\frac{dy}{dx} = 0$ $\frac{dy}{dx} = 3x^2 + 18x + 15 = 0$ $x = -5$ *or* -1 At B, $x = -1$ Therefore, stationary point is $(-1, 5)$
	Obtains $x = -1$ from $3x^2 + 18x + 15\ (= 0)$ OE	1.1a	A1	
	Completes reasoned argument to obtain $(-1, 5)$ Must have obtained $x = -5$ and $x = -1$ when solving $\frac{dy}{dx} = 0$ **and** explained that stationary points occur when $\frac{dy}{dx} = 0$ OE	2.1	R1	
	Subtotal		**3**	

	Question 7 Total		**9**	