

Q	Marking instructions	AO	Marks	Typical solution
4(a)	Substitutes $x = 6$ into $p(x)$	1.1a	M1	$p(6) = 4 \times 6^3 - 15 \times 6^2 - 48 \times 6 - 36$ $= 0$ $\therefore x - 6 \text{ is a factor of } p(x)$
	Completes reasoned proof by stating $p(6)=0$ and clearly states that this implies that $x - 6$ is a factor	2.1	R1	
4(b)(i)	Factorises with at least two terms correct or differentiates $p(x)$ with at least two terms correct	3.1a	M1	$4x^3 - 15x^2 - 48x - 36 = (x-6)(4x^2 + 9x + 6)$ $b^2 - 4ac = 9^2 - 4 \times 4 \times 6$ $= -15$ < 0 $\therefore 4x^2 + 9x + 6 = 0 \text{ has no real roots}$ Hence $p(x) = 0$ has exactly one real root.
	Obtains fully correct quadratic factor or obtains fully correct derivative	1.1b	A1	
	Calculates their discriminant or sets their quadratic = 0 or sketches their quadratic PI concluding no real root or sets their derivative = 0 and obtains their turning points (x, y) OE	1.1a	M1	
	States $-15 < 0$ and concludes reasoned argument OE or states roots are non-real roots and concludes reasoned argument or states correct turning points and concludes reasoned argument	2.1	R1	
4(b)(ii)	States coordinates of point of intersection	1.1b	B1	(6, 0)
Total			7	