

Q	Marking instructions	AO	Marks	Typical solution
10	States $5(x+h)^3 + (x+h) - (5x^3 + x)$ Condone missing brackets	1.1a	M1	$\frac{f(x+h)-f(x)}{h} = \frac{5(x+h)^3 + (x+h) - (5x^3 + x)}{h}$ $= \frac{5(x^3 + 3x^2h + 3xh^2 + h^3) + h - 5x^3}{h}$ $= \frac{15x^2h + 15xh^2 + 5h^3 + h}{h}$ $= 15x^2 + 15xh + 5h^2 + 1$ $f'(x) = \lim_{h \rightarrow 0} 15x^2 + 15xh + 5h^2 + 1$ $f'(x) = 15x^2 + 1$
	Expands $(x+h)^3$ correctly Like terms need not be collected Accept all terms multiplied by 5 May be embedded	1.1a	M1	
	Obtains $\frac{15x^2h + 15xh^2 + 5h^3 + h}{h}$ correctly eliminating $5x^3$ and x PI by $15x^2 + 15xh + 5h^2 + 1$ having seen a division by h Like terms need not be collected	1.1b	A1	
	Obtains $15x^2 + 15xh + 5h^2 + 1$ by correctly dividing by h Like terms need not be collected	2.1	A1	
	Completes a reasoned argument using the $\lim_{h \rightarrow 0}$ to prove that $f'(x) = 15x^2 + 1$ $f'(x)$ may be seen on the final line or before Do not allow $\frac{dy}{dx}$ for $f'(x)$	2.5	R1	
Question 10 Total			5	