Question	Scheme	Marks	AOs
4	$\dfrac{(x+h)^2 - x^2}{h} = \dfrac{x^2 + 2xh + h^2 - x^2}{h}$	M1	2.1
	$= \dfrac{2xh + h^2}{h}$	A1	1.1b
	$\dfrac{dy}{dx} = \lim_{h \to 0} \dfrac{2xh + h^2}{h} = \lim_{h \to 0}(2x + h) = 2x$ *	A1*	2.5
		(3)	
			(3 marks)

Notes

Note: Throughout the question allow use of δx for h or any other letter e.g. α if used consistently. If δx is used then you can condone e.g. $\delta^2 x$ for δx^2 as well as condoning e.g. poorly formed δ's

M1: Begins the process by writing down the gradient of the chord and attempts to expand the correct squared bracket – you can condone "poor" squaring e.g. $(x+h)^2 = x^2 + h^2$ but the $-x^2$ must be present.

A1: Reaches a correct fraction o.e. with the x^2 terms cancelled out and with no algebraic errors, e.g. $\dfrac{\cancel{x^2} + 2xh + h^2 - \cancel{x^2}}{h}$, $2x + h$ is correct.

A1*: Completes the process by applying a limiting argument and deduces that $\dfrac{dy}{dx} = 2x$ with no errors seen. They must have = $2x$ and not just $\lim_{h \to 0} 2x$ to complete the proof.

$\dfrac{dy}{dx} =$ or an equivalent e.g. $f'(x) =$ or "Gradient =" must be evident somewhere in their working or final line. If $f'(x)$ is used then there is no requirement to see f (x) defined first. Condone e.g. $\dfrac{dy}{dx} \to 2x$ or $f'(x) \to 2x$.

Condone missing brackets to allow e.g. $\dfrac{dy}{dx} = \lim_{h \to 0} \dfrac{2xh + h^2}{h} = \lim_{h \to 0} 2x + h = 2x$

Do not allow $h = 0$ if there is never a reference to $h \to 0$.

e.g. $\dfrac{dy}{dx} = \lim_{h \to 0} \dfrac{2xh + h^2}{h} = \lim_{h \to 0} 2x + 0 = 2x$ is acceptable

but e.g. $\dfrac{dy}{dx} = \dfrac{2xh + h^2}{h} = 2x + 0 = 2x$ is not unless $h \to 0$ is seen.

The $h \to 0$ does not need to be present throughout the proof e.g. appear on every line but must appear at least once.

They must reach $2x + h$ at the end and not $\dfrac{2xh + h^2}{h}$ (without the h's cancelled) to complete the limiting argument.