

Find the gradient of the tangent line of the below function when $x = 2$

$$f(x) = 2x^2 + x$$

$$2(2)^2 + 2$$

$$F(2, 10)$$

$$M \left(\begin{matrix} x_1 & y_1 \\ x_2 & y_2 \end{matrix} \right) = \left(\begin{matrix} 2+h & 2(2+h)^2 + (2+h) \end{matrix} \right)$$

$$(z+h)(z+h)$$

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{[2(2+h)^2 + 2+h] - 10}{2+h - 2}$$

$$\begin{aligned} & 2(4 + 4h + h^2) + 2+h \\ & 8 + 8h + 2h^2 + 2+h \end{aligned}$$

$$= \frac{8 + 8h + 2h^2 + 2+h - 10}{2+h - 2}$$

$$= \frac{9h + 2h^2}{h} = \frac{h(9 + 2h)}{h}$$

$$= 9 + 2h$$



As h approaches 0 for the function $f(x) = 2x^2 + x$, the gradient of the tangent line is 9