

① Find the derivative of the function using the definition of derivative.

$$f(x) = 3x^2 + x$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{3(x+h)^2 + (x+h) - (3x^2 + x)}{h} =$$

$$\lim_{h \rightarrow 0} \frac{3(x^2 + 2hx + h^2) + x + h - 3x^2 - x}{h} = \lim_{h \rightarrow 0} \frac{3x^2 + 6hx + 3h^2 + h - 3x^2}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(6x + 3h + 1)}{h} = \lim_{h \rightarrow 0} 6x + 3h + 1 = \boxed{6x + 1}$$

② Find the equation of the tangent line to the curve at the point (3,0).

$$f(x) = x^2 + 3x - 18$$

$$f'(x) = 2x + 3$$

$$f'(3) = 2(3) + 3 = 9$$

$$y = mx + b$$

$$0 = 9(3) + b$$

$$-27 = b$$

$$\boxed{\text{So } y = 9x - 27}$$