

$$1) f_{(x)} = (x + 1)^2$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{((x + \Delta x) + 1)^2 - (x + 1)^2}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{(x + \Delta x + 1)^2 - (x + 1)^2}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{(x^2 + \Delta x^2 + 1 + 2x\Delta x + 2x + 2\Delta x) - (x^2 + 2x + 1)}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{x^2 + \Delta x^2 + 1 + 2x\Delta x + 2x + 2\Delta x - x^2 - 2x - 1}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{\Delta x^2 + 2x\Delta x + 2\Delta x}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \frac{\Delta x(\Delta x + 2x + 2)}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \rightarrow 0} \Delta x + 2x + 2 =$$

$$f'_{(x)} = 0 + 2x + 2$$

$$f'_{(x)} = 2 + 2x = 2(x + 1)$$