$$2) f_{(x)} = \frac{2}{x^2+5} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{\frac{2}{(x+\Delta x)^2+5} - \frac{2}{x^2+5}}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{\frac{2}{x^2+2x\Delta x+\Delta x^2+5} - \frac{2}{x^2+5}}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{\frac{2(x^2+5)-2(x^2+2x\Delta x+\Delta x^2+5)}{(x^2+2x\Delta x+\Delta x^2+5)(x^2+5)}}{\Delta x} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{2(x^2+5)-2(x^2+2x\Delta x+\Delta x^2+5)}{\Delta x(x^2+2x\Delta x+\Delta x^2+5)(x^2+5)} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{\cancel{2x^2} \cancel{+10} \cancel{-2x^2} - 4x\Delta x - 2\Delta x^2 \cancel{-10}}{\Delta x(x^2+2x\Delta x+\Delta x^2+5)(x^2+5)} =$$

$$f'_{(x)} = \lim_{\Delta x \to 0} \frac{-2\cancel{\Delta x}(2+\Delta x)}{\cancel{\Delta x}(x^2+2x\Delta x+\Delta x^2+5)(x^2+5)} =$$

$$f'_{(x)} = \frac{-2(2+\cancel{0})}{(x^2+\cancel{2x\cdot 0}+\cancel{0^2}+5)(x^2+5)} =$$

$$f'_{(x)} = \frac{-4x}{(x^2+5)^2} = -\frac{4x}{(x^2+5)} = -\left(\frac{2x}{x^2-5}\right)^2$$