

Given  $f(x)$ , find  $f'(x)$ . Don't simplify.

$$1. f(x) = \frac{3}{x} + e^{-3x} + 72 = 3x^{-1} + e^{-3x} + 72 \implies f'(x) = -3x^{-2} + e^{-3x}(-3) + 0$$

$$2. f(x) = e^x \ln(x) + 2x + 1 \implies f'(x) = e^x \ln(x) + e^x \frac{1}{x} + 2$$

$$3. f(x) = (x^2 + 2)^{100} \implies f'(x) = 100(x^2 + 2)^{99}(2x)$$

$$4. f(x) = \frac{\ln(x^2 + 5)}{e^x + 1} \implies f'(x) = \frac{\frac{1}{x^2+5}(2x)(e^x + 1) - \ln(x^2 + 5)(e^x)}{(e^x)^2}$$