

Name: _____

Quiz 21, section 5.3, Simplify your answers!

1. (2 pts) Find the derivative of
- $f(x) = \int_6^x \frac{t}{t^2+1} dt$

$$f'(x) = \frac{x}{x^2+1}$$

2. (2 pts) Find the derivative of
- $f(x) = \int_x^7 \ln(e^t+1) dt$

$$f'(x) = -\ln(e^x+1)$$

3. (3 pts) Find the derivative of
- $f(x) = \int_{-3}^{x^3} t^3 - 2t^2 + 5t + 6 dt$

$$\begin{aligned} f'(x) &= \left((x^3)^3 - 2(x^3)^2 + 5(x^3) + 6 \right) [3x^2] \\ &= (x^9 - 2x^6 + 5x^3 + 6)(3x^2) \end{aligned}$$

4. (3 pts) Find the derivative of
- $f(x) = \int_{3x+1}^{e^x} \ln t + \tan^{-1} t dt$

$$f'(x) = \left[\underset{\substack{\downarrow \\ x}}{\ln e^x + \tan^{-1} e^x} \right] [e^x] - \left[\ln(3x+1) + \tan^{-1}(3x+1) \right] [3]$$