Math 155    Worksheet 9

Name: 
ID: 

1. Find a formula for the inverse function of each of the following functions.
   (a) \( f(x) = \frac{4 \ln(x) - 1}{2 \ln(x) + 3} \).

   (b) \( f(x) = \frac{3 + 2e^x}{2 - 3e^x} \).

2. (Exercises 39, 40, on Page 159).
   (a) Suppose that \( f^{-1} \) is the inverse function of a differentiable function \( f \), and \( f(4) = 5 \), \( f'(4) = \frac{2}{3} \). Find \( (f^{-1})'(5) \).

   (b) Suppose that \( f^{-1} \) is the inverse function of a differentiable function \( f \), and let \( G(x) = \frac{1}{f^{-1}(x)} \). If \( f(3) = 2 \) and \( f'(3) = \frac{1}{5} \), find \( G'(2) \).

3. Compute the following.
   (a) \( \lim_{x \to \infty} \frac{2 + 3 \ln(x)}{4 - 5 \ln(x)} \).

   (b) \( \lim_{x \to 4^+} e^{6/(4-x)+x} \).
4. Suppose that $2e^{x^2}y = x + y$.
(a) Find $y'$.

(b) Find an equation of the tangent line to the curve $2e^{x^2}y = x + y$ at the point $(2, 0)$.

5. Find the derivative of these functions.
(a) $f(x) = \ln(x^2 + 10)$.

(b) $f(x) = e^{\cos(\ln(x))}$.

(c) $f(x) = e^{\sin(\sqrt{x})}$

(d) $f(x) = \log_{10}\left(\frac{x}{x - 1}\right)$.

(e) $y = \ln(\sec(x) + \tan(x))$. (This exercise might be useful later or in Cal II).