1. The line $y = 3x + 5$ is tangent to the graph of a function $f$ at the point $(1, 8)$.
   
   (a) (2 points) Find $f(1)$.

   (b) (2 points) Find $f'(1)$.
2. Let $f(x) = \ln(x + 3) + 4$.

(a) (2 points) Find the domain and range of $f$.

(b) (2 points) Find a formula for $f^{-1}(x)$.

(c) (2 points) Find the domain and range of $f^{-1}$. 
3. Let \( f(x) = \frac{\sqrt{9x^2 + 5}}{x + 2} \).

(a) (6 points) Identify all asymptotes (vertical and horizontal) of \( f \).

(b) (2 points) What is the domain of \( f \)?
4. (6 points) Let \( f(x) = x^4 - 2x^3 - x^2 - 1 \). Show that the equation \( f(x) = 0 \) has at least one negative root.
5. (6 points) Evaluate \( \lim_{x \to 2} \frac{\sqrt{6x^2 + 1} - 5}{x - 2} \). Be sure to show all of your work.