1. (8 pts) Let \( f(x) = (3x - 10)^3 \).
   a. Find \( f'(x) \).
   
   b. Find the equation of the tangent line to the curve \( y = f(x) \) where \( x = 3 \).

# 2-5 (6 pts each) Find the derivatives of the following functions. Do not simplify.

2. \( g(x) = \frac{4}{x^2} + \sqrt[3]{5x^2} + 6x - 1 \)

3. \( h(x) = \sin(\sqrt{4x + 3}) \)

4. \( y = 2xe^{\sec x} \)

5. \( f(x) = (e^3 - 10^e + 4^{3x-2}) \)
6. (8 pts) Find the derivative. Then factor the numerator completely and reduce to lowest terms.

\[ h(x) = \left( \frac{\tan 6x}{e^{4x}} \right) \]

7. (10 pts) Find \( \frac{dy}{dx} \) using implicit differentiation. \( x^2y + e^{3y} = \cos x - y \)

8. (5 pts) Use a \( \delta, \varepsilon \) argument to prove that \( \lim_{x \to 6} (4x + 1) = 25 \).

**Extra Credit** (5 pts) On the back, use an \( N, \varepsilon \) argument to prove that \( \lim_{x \to \infty} \left( \frac{1}{x^3} \right) = 0 \).