Name __________________________________________

• No calculators allowed.
• Show sufficient work to justify each answer.
• You have 15 minutes for this quiz.

1. (2 points each) Find derivatives for each of the following functions.
   
   (a) $v = 3r^5 + r - \frac{5}{r^2 + 3}$

   (b) $w = t^4 + 5t + e^\pi$

2. (2 points) Find the equation of the tangent line to the curve $g(x) = e^x + 3x^4 + x$ at point $(0, 1)$. 
3. (2 points) Show that at no point on the graph of \( f(x) = x^3 + e^x + 5x^7 + 47 \), the tangent line to the curve is horizontal.

4. (2 points) Differentiate:

\[ y = \frac{\sqrt{x} + x^{-1}}{\sqrt{x}} \]