Name: _____

1. **[3 parts, 2 points each]** Differentiate the given function.

   (a) $f(x) = 2x^4 - 3x^2 + x - 8$

   (b) $f(x) = \dfrac{3}{x^2} - 2\sqrt{x} + \dfrac{1}{\sqrt{4x}} + x^{-4.1} + \sqrt{5}$

   (c) $f(x) = \dfrac{x^3 + 6}{\sqrt{x} - 1}$

OVER →

2. **[2 points]** Decide if the following function is continuous at the specified value of x, and explain why.

$$f(x) = \begin{cases} x^2 + 1 & \text{if } x < 3 \\ 8 & \text{if } x = 3 \\ 2x + 4 & \text{if } x > 3 \end{cases} \qquad \text{at } x = 3$$

3. **[2 points]** Find an equation for the tangent line to the given curve at the point where $x = x_0$.
$y = (2\sqrt{x} + 5x)(x^2 - 1)$; $x_0 = 1$