Problem Definition

Problem 47. Find an equation for the tangent line to the graph of the following function at the given point.

\[ y = -2x^4 + 5x^2 - 3 \quad (1, 0) \]

Solution Step 1:

To get the slope of the tangent line we will need the derivative of the function given in the problem. The derivative is the following.

\[ \frac{dy}{dx} = -8x^3 + 10x \]

Substituting the value \( x = 1 \) into the derivative expression gives

\[ \frac{dy}{dx} = -8(1)^3 + 10(1) = 2 \]

Solution Step 2:

The form of linear equation that works best in this case is the point-slope form of the linear equation. The form is

\[ y - y_0 = m(x - x_0) \]

with \( m = 2 \), the slope of the tangent line, and \((x_0, y_0) = (1, 0)\). The equation is given by

\[ y - 0 = 2(x - 1) \]

or

\[ y = 2x - 2 \]