Problem Definition

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

$$y = -2x^4 + 5x^2 - 3 \qquad (1, 0)$$

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

$$y = 2x - 2$$