1. For the implicitly defined relation below, find the equation of the tangent line at the point \((0, 1)\).

\[ y^2 = \sin x + xy + 1 \]

First, the derivative (using implicit differentiation and the product rule for \(xy\)) [2 points]:

\[ 2y \frac{dy}{dx} = \cos(x) + y + x \frac{dy}{dx} \]

Then, solve for \(\frac{dy}{dx}\) [2 points]:

\[ 2y \frac{dy}{dx} - x \frac{dy}{dx} = \cos(x) + y \]

\[ \frac{dy}{dx} = \frac{\cos(x) + y}{2y - x} \]

Next, we find that value of the derivative corresponding to the point \((x, y) = (0, 1)\) [1 point]:

\[ \left. \frac{dy}{dx} \right|_{(0,1)} = \frac{\cos(0) + 1}{2 \cdot 1 - 0} = \frac{1 + 1}{2} = 1 \]

Finally, find the equation of the tangent line with the point-slope formula.

\[ y - y_1 = m(x - x_1) \]

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

\[ y = x + 1 \]

2. Chain rule for all three of these:

(a) \( f(x) = \ln(x^2 + 2x) \)

\[ f'(x) = \frac{2x + 1}{x^2 + 2x} \]

(b) \( g(x) = \cos(\sin(x)) \)

\[ g'(x) = -\sin(\sin(x)) \cdot \cos(x) \]

(c) \( h(x) = \sqrt{x^4 + 3x^3 - 2x + 1} \)

\[ h'(x) = \frac{1}{2} \left( x^4 + 3x^3 - 2 \right)^{-1/2} \cdot (4x^3 + 9x^2 - 2) = \frac{4x^3 + 9x^2 - 2}{2\sqrt{x^4 + 3x^3 - 2}} \]