1. (2 points) (Derivative of logarithm)

\[ \frac{d}{dx} (\log_{109} |x|) = \frac{1}{\ln(109)} \cdot \frac{1}{x}. \]

2. (2 points) (Derivative of exponential)

\[ \frac{d}{dx} (191^x) = \ln(191) \cdot 191^x. \]

3. Consider the curve \(x^2 + xy - y^2 = 1\).

   (a) (2 points) Verify that the point \((2, 3)\) is on the curve.

   **Solution:** We plug \(x = 2\) and \(y = 3\) into the equation of the curve and verify that we get true.
   \[ 2^2 + 2 \cdot 3 - 3^2 = 4 - 6 + 9 = 1 \checkmark \]

   (b) (4 points) Find the equation of the line that is tangent to the curve at \((2, 3)\).

   **Solution:** To find a tangent line, we need a slope \(m\) and a point on the line. We are given the point \((2, 3)\). To find the slope, we need to compute \(\frac{dy}{dx}\). Then the slope is \(m = \frac{dy}{dx}\bigg|_{(2,3)}\).

   We compute using implicit differentiation
   
   \[ x^2 + xy - y^2 = 1 \]
   \[ 2x + x \frac{dy}{dx} + y - 2y \frac{dy}{dx} = 0 \]
   \[ 4 + 2m + 3 - 6m = 0 \]
   \[ -4m = -7 \]
   \[ m = \frac{7}{4}. \]

   It follows that the tangent line is
   
   \[ y - 3 = \frac{7}{4}(x - 2). \]