1. (4 points) Find \( \frac{dy}{dx} \)
   
   a) \( y = \sin(\sin(x)) \)
   
   b) \( y = \frac{1}{\ln x} \)
   
   c) \( y = \sqrt{x^4 + 2x^2 - 1} \)
   
   d) \( y = x^x \)

2. (4 points) Draw the tangent line to a point \((x_0, y_0)\) on the hyperbola defined by \(x^2 - y^2 = 1\). Find an equation for the \(x\)-intercept of this line in terms of \(x_0\).

3. (4 points) A naval destroyer is tracking a submarine 300 meters below the ocean. Using sonar, it is determined that the distance between the submarine and the destroyer is exactly 1 kilometer, and increasing at 75 kilometers per hour. How fast is the submarine traveling?

4. (4 points) Estimate \( \sin^2(4\pi/9) \).

5. (4 points) The golden ratio is the positive number \( \phi \) satisfying \( \phi^2 - \phi - 1 = 0 \). Approximate the golden ratio using two iterations of Newton's method starting at \( c_0 = 1 \).

6. (4 points) Implicitly differentiate the equation

   \[ \ln(xy) = \frac{x}{y} \]

   twice and solve for \( \frac{d^2y}{dx^2} \). Your answer should have no \( \frac{dy}{dx} \) in it.