1. Show the derivative of $f(x) = \arcsin(x)$ is $f'(x) = \dfrac{1}{\sqrt{1-x^2}}$.

2. Compute the derivative of the function $f(x) = \arcsin\left(\ln\left(\frac{1}{\sqrt{1-x^2}}\right)\right)$.

3. Take $f(x) = \left(\frac{(\cos(x)-2x)(\exp_2(x)+4)}{\sin(x)+4}\right)^3$. Determine f' by using logarithm differentiation.

4. Take $f(x) = (x+3)^{\sin(x)}$. Determine $f'(x)$.

5. Take f to be the function that is given by $f(x,y) = 5x^2y^4 + 4xy + \csc(-8x+3y^2)$. Determine $f_x(1,2)$ and $f_y(1,2)$.

6. Assume that y is defined implicitly by the equation $y^2x + \arctan(y+2) = xy$. Calculate $\frac{dy}{dx}$.

7. The equation $x^4y - xy^8 = -899934390$ implicitly defines y as a function of x in an open rectangle around the point $(9, 10)$. Determine an equation for the line that is tangent to the solution set to the equation at the point $(9, 10)$.

8. A spherical balloon is being inflated with air at a rate so its volume is increasing at a rate of 150 centimeters cubed per second. Determine the rate at which the surface area is changing when the diameter of the balloon is 65 centimeters.