Assignment 3
due: October 31

1. Suppose $f(x)$ is a twice differentiable function. Find $f''(1)$, if $f(x)+x^2(f(x))^3 = -2$, $f(1) = -1$, and $f'(1) = \frac{1}{2}$. Show your work.

2. Find derivatives of the following functions. Show your work.

   (a) $y = \arctan(\sqrt{\sin x})$

   (b) $y = x \cdot \arccos x - \sqrt{1 - x^2}$

   (c) $y = \arcsin\left(\dfrac{x}{a}\right)$, where $a > 0$ is a constant

   (d) $y = \log_a x$, where $a > 0$, $a \neq 1$.

3. Find the equation of the tangent line to the curve $x^4 + \cos y = e^x \sin y$ at the point $(0, \frac{\pi}{4})$. Show your work.

4. Find $f''(0)$, if $f(x) = e^{\cos x} g(x)$, where $g(x)$ is a twice differentiable function satisfying $g(0) = 2$, $g'(0) = 1$, and $g''(0) = 3$. Show your work.

5. Find all points at which the curve $x^4 + y^4 = 16$ has a vertical tangent. Show your work.