Directions: show all work and simplify your answers

1. Find the derivatives of the following functions:

   a) y = cos(sec(4x))

   b) $f(x) = [(x^4 - 3)^8 - 4x^3]^5$

   c) $y = cos^5(sin^3(x))$

2. Find an equation of the tangent line to the curve at the given point:

   a) f(x) = $\sqrt{1 + x^6}$ at the point (2,3)

   b) f(x) = $x^3 + 2x^4 - 6$ at the point (3,2)

c) f(x) = $sin(x) + 3x^4$ at a point where x = $\frac{\pi}{4}$

3. Find the $\frac{dy}{dx}$ by using implicit differentiation

a) $2x^3 - xy^2 + x^3 + y^4$

b) $x^2y^{10} = 9$

c) $sin(x) + 4cos(y) - 3y^2 = 9x$

d) $x^3 = (4y^2x^4 + 3x^2)$