1. Compute the derivative of each of these functions. Simplify the answer when possible.

$(a)\ y = (\ln x)\cdot(\sec x)$ $(b)\ y = \ln(\sec x)$ $(c)\ y = \sec(\ln x)$

$(d)\ f(x) = e^{\tan x}$ $(e)\ v(t) = \cos^2(3t)$ $(f)\ h(x) = x\sqrt[3]{x^9 + 2}$

2. Find the equation of the tangent line to the graph of $f(x) = e^{-3x}$ at $x = 0$.

3. Show that $y = e^{-x^2}$ is a solution of the differential equation $y'' - (y')^2 + 2y = 0$.

4. Use logarithmic differentiation to find the derivative of

$(a)y = a^x$ $\qquad\qquad\qquad\qquad$ $(b)y = x^{\sin x}$ $\qquad\qquad\qquad\qquad$ $y = x^{3^{x^3}}$

5. Use logarithmic differentiation to prove the product and quotient rules.

6. Pb. 74 section 3.3