Mathematics 3208 Name:_____

Worksheet: Calculus of Exponential and Logarithmic Functions

---

1. Determine the derivative for each of the following and make any obvious simplifications.

a) $f(x) = x^4 e^{\sin(2x)}$

b) $f(x) = \csc(x^3 e^x)$

c) $f(x) = \sqrt{\sec(6^x)}$

d) $f(x) = 10^{\cos(7x)}$

e) $f(x) = \left(\dfrac{e^{2x} - 1}{e^{2x} + 1} \right)^4$

f) $f(x) = \ln\left[(2x+7)^7 (3x+9)^9 \right]$

g) $f(x) = e^{\frac{x}{4-x^2}}$

h) $f(x) = 5^{\tan x} \ln(\sec(4x))$

i) $f(x) = \cos(e^{x^4})$

j) $f(x) = \ln\left(\frac{3^x + 1}{3^x - 1}\right)^5$

k) $y = \log_4(\sin(e^{2x}))$

l) $y = 5^{x^3} \log(x^4)$

m) $y = \log_3 \sqrt{x^5 + x^2}$

2. Determine $\frac{dy}{dx}$ for each of the following:

a) $y = \frac{(2x-1)^4}{(x^3+1)^5 \sqrt{8x^2+1}}$

b) $y = x^{\cos x}$

c) $y = (\sin x)^{\sin x}$

3. Find the equation of the tangent line to the curve $2x - y\ln y = 4$ at the point $(2,1)$.

4. Find the equation of the normal line to the curve $y = \ln\left(e^x + e^{2x}\right)$ at the point $(0, \ln 2)$