Review of the Exponential Function.

(1) True or false: if $f(x) = e^4$ for all x then $f'(x) = e^4$.

(2) Find the slope of the tangent line to $f(x) = e^{(e^x + x)}$ at $x = 2$.

(3) Find the maximum and minimum values of $(x+1)e^{-x^2}$.

(4) Show that the equation $xe^x = 1$ has no solutions in the interval $(1, 2)$.

The Natural Logarithm Function.

(1) Simplify.

  (a) $e^{(\ln x + \ln(x^2))}$

  (b) $\ln(\ln(e^2)\ln 1)$.

  (c) $\ln 5 + \ln 10 - \frac{1}{2}\ln 625$.

(2) Find the minimum value of $x^3 \ln x$ if $x > 0$.

(3) Find the points on the graph of $y = \ln(x^3 + x^4)$ where the tangent line is perpendicular to the line $y = 1 - \frac{x}{4}$.

(4) Solve for x.

  (a) $\ln(\ln(-5x)) = 0$

  (b) $e^{3x} \cdot e^{\ln 3} = 2$

  (c) $\ln(\sqrt[3]{x^2 - 5}) + \ln(5x+1) + \ln 6 = 0$

(5) How many lines tangent to the curve $y = e^{x^2}$ contain the point $(0, 1)$?

(6) Use logarithmic differentiation to differentiate.

  (a) $f(x) = x^x$.

  (b) $f(x) = (x^2+1)\sqrt{(x+7)(x-13)}$.