Tutorial 6

Week of October 22, 2018

1. Differentiate the following functions.
   (a) $f(x) = 2^{40}$
   (b) $f(x) = e^5$
   (c) $f(x) = (3x^2 - 5x)e^x$
   (d) $g(x) = x^2(1 - 2x)$
   (e) $y = \sqrt[3]{x}(2 + x)$
   (f) $g(x) = \dfrac{x^2 - 2}{2x + 1}$
   (g) $h(x) = x^{2.4} + e^{2.4}$
   (h) $y = e^{x+1} + 1$

2. Find the equation of the tangent line of $y = 2e^x + x$ at the point $P(0, 2)$.

3. Find the equation of the tangent line of $y = \dfrac{1 + x}{1 + e^x}$ at the point $P(0, \frac{1}{2})$.

4. Show that $y = 2e^x + 5x^3 + 3x$ does not have a tangent with slope 2.

5. Find the equation of the tangent line to the curve $f(x) = x^4 + 1$ that is parallel to $32x - y = 15$.

6. Given $h(2) = 4$ and $h'(2) = -3$, find:
$$\frac{d}{dx}\left(\frac{h(x)}{x}\right)\bigg|_{x=2}$$