Derivative of the NATURAL EXPONENTIAL Function

$$\frac{d}{dx}[e^x] = e^x \qquad \text{or if } y = f(x) = e^x, \ y' = \frac{dy}{dx} = e^x$$

$$\frac{d}{cx}[e^u] = e^u\left(\frac{du}{dx}\right) \quad \text{or if } y = f(u) = e^u, \ \frac{dy}{dx} = e^u u' \text{ or } e^u\left(\frac{du}{dx}\right)$$

(using chain rule)

Example 1:
Find the slope of the tangent line to each exponential function at the point given.

  $a)$ $y = e^{2x}$ (0,1) $\qquad\qquad$ $b)$ $y = e^{-x}$ (0,1)

Example 2:
Find the derivative of the function.

  $a)$ $y = e^{\left(\frac{3}{2}x\right)}$ $\qquad\qquad$ $b)$ $y = e^{3-2x}$

  $c)$ $y = e^{-2x^2}$ $\qquad\qquad$ $d)$ $y = e^{(3/x)}$

Example 3: Find an equation of the tangent line to the function at the given point.

a) $y = e^{\left(x^2 - 4x\right)}$ $(0,1)$ b) $y = e^{-x^3}$ $(-1,e)$