C12 - 2.12 - Exp Derivatives Notes

$$y' = \frac{dy}{dx} = f'(x)$$

$y = e^x$
$y' = e^x ln e$
$y' = e^x$

$y = 2^x$
$y' = 2^x ln 2$

$y = e^{2x}$
$y' = e^{2x} \times 2$
$y' = 2e^{2x}$

$y = 5^{3x}$
$y' = 5^{3x} ln 5 \times 3$
$y' = 3ln5(5)^{3x}$

$y = e^{that}$
$y' = e^{that} \times chain\ that$

$y = a^{that}$
$y' = a^{that}(lna) \times chain\ that$

$y = e^x$
$y' = e^x$
$y'' = e^x$
...

$y = ex$
$y' = e$

$y = xe^2$
$y' = e^2$

$y = e^{1+lnx}$
$y = e^1 e^{lnx}$
$y = ex$
$y' = e$

$y = e^{\sqrt{x}}$
$y' = e^{\sqrt{x}} \times \frac{1}{2\sqrt{x}}$
$y' = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$

$y = e^{lnx}$
$y' = e^{lnx}\left(\frac{1}{x}\right)$
$y' = \frac{e^{\ln_e x}}{x}$
$y' = \frac{x}{x}$
$y' = 1$

$y = e^{\ln_e x}$
$y = x$
$y' = 1$

Log Rules

$y = \frac{e^x}{x}$
$y' = \frac{e^x(x) - 1(e^x)}{x^2}$
$y' = \frac{e^x(x-1)}{x^2}$

$y = x^2 3^x$
$y' = 2x(3^x) + 3^x ln3(x^2)$
$y' = x3^x(2 + xln3)$

$y = x^3 e^{2x}$
$y' = 3x^2(e^{2x}) + e^{2x}(2)(x^3)$
$y' = x^2 e^{2x}(3 + 2x)$

$y = \frac{e^{2x}}{x}$
$y' = \frac{e^{2x}(2)(x) - 1(e^{2x})}{x^2}$
$y' = \frac{e^{2x}(2x-1)}{x^2}$

$y = e^{sinx}$
$y' = e^{sinx} cosx$

$y = \tan(e^{\sqrt{x}})$
$y' = \sec^2(e^{\sqrt{x}}) \times \left(\frac{e^{\sqrt{x}}}{2\sqrt{x}}\right)$
$y' = \frac{e^{\sqrt{x}} \sec^2 e^{\sqrt{x}}}{2\sqrt{x}}$