$\frac{d}{dx}(e^x) = e^x$

$\frac{d}{dx}(e^u) = e^u \cdot \frac{d}{dx}(u) \leftarrow$

$= u' e^u$

1. $y = e^{3x-1}$

$y' = e^{3x-1} \cdot \frac{d}{dx}(3x-1)$

$= e^{3x-1} \cdot 3$

$y' = 3e^{3x-1}$

2. $y = e^{\sqrt[3]{x}}$

$y' = e^{\sqrt[3]{x}} \cdot \frac{d}{dx}(\sqrt[3]{x})$

$y' = e^{\sqrt[3]{x}} \cdot \frac{d}{dx}(x^{\frac{1}{3}})$

$y' = e^{\sqrt[3]{x}} \cdot \frac{1}{3}x^{-\frac{2}{3}}$

$y' = \frac{e^{\sqrt[3]{x}}}{3x^{2/3}}$

3. $y = \underbrace{x^2}_{P}\underbrace{e^{9x-1}}_{Q}$

$P' = 2x \quad Q' = e^{9x-1} \cdot \frac{d}{dx}(9x-1)$

$= e^{9x-1} \cdot 9$

$= 9e^{9x-1}$

$P'Q + PQ'$

$y' = 2xe^{9x-1} + x^2 \cdot 9e^{9x-1}$

$= xe^{9x-1}(2 + 9x)$

4. $y = \frac{(e^x + e^{-2x})^5}{3}$

$y = \frac{1}{3}(e^x + e^{-2x})^5$

$y' = \frac{1}{3} \cdot 5(e^x + e^{-2x})^4 \cdot \frac{d}{dx}(e^x + e^{-2x})$

$= \frac{5}{3}(e^x + e^{-2x})^4 \cdot (e^x + e^{-2x} \cdot \frac{d}{dx}(-2x))$

$= \frac{5}{3}(e^x + e^{-2x})^4 \cdot (e^x - 2e^{-2x})$