

Name: _____

1. Find the inverse of
- $f(x) = (\ln(x^3))^5$
- .

$$y = (\ln(x^3))^5$$

$$\sqrt[5]{y} = \ln(x^3)$$

$$\sqrt[5]{y} = 3 \ln x$$

$$\frac{\sqrt[5]{y}}{3} = \ln x$$

$$e^{\frac{\sqrt[5]{y}}{3}} = x$$

$$y = e^{\frac{\sqrt[5]{x}}{3}}$$

$$f^{-1}(x) = e^{\frac{\sqrt[5]{x}}{3}}$$

2. Evaluate the integral
- $\int e^x + x^e dx$
- .

$$\int e^x + x^e dx = e^x + \frac{x^{e+1}}{e+1} + C$$

3. Find the derivative of
- $y = x^{2x}$
- .

$$\ln y = \ln(x^{2x})$$

$$\ln y = 2x \ln x$$

$$\frac{y'}{y} = 2x \cdot \frac{1}{x} + 2 \ln x$$

$$y' = (2 + 2 \ln x) y$$

$$y' = (2 + 2 \ln x) x^{2x}$$