Name: _____

1. Find the domain and range of
$$f(x) = \frac{3}{1 - e^{2x}}.$$

2. In each of the following cases, find $f^{-1}(x)$ and identify the domain and range of $f^{-1}(x)$. To check your work, show that $f\left(f^{-1}(x)\right) = f^{-1}\left(f(x)\right) = x$.

   (a) $f(x) = x^3 + 1$

   (b) $f(x) = \dfrac{x + 3}{x - 2}$

3. Simplify the following expressions.

(a) $\ln(3x^2 - 9x) + \ln\left(\dfrac{1}{3x}\right)$

(b) $3\ln\left(\sqrt[3]{t^2 - 1}\right) - \ln(t + 1)$

(c) $e^{\ln(7.2)}$

(d) $\left(\left(\dfrac{\sqrt[7]{x^3}}{x^{2/3}}\right)^{-1}(x)\right)^8$