

Name:

A#:

1. Sketch the graphs of the curves  $y = 1 + \ln(x - 2)$  and  $y = 1 - e^{1-x}$  on the same set of axes. Label your sketch clearly, including all asymptotes and  $x, y$ -intercepts.

2. Find the derivative of each of the following. You **do not** need to simplify your answers.

(a)  $f(x) = x^3 \log_5(x^2 + 5^x)$

(b)  $f(x) = \ln \sqrt{\frac{1+x}{1-2x^2}}$

3. Use logarithmic differentiation to find  $y'(x)$ , where

$$y(x) = \frac{e^{x^3}(1+x^2)^x}{(1+e^x)\sqrt[4]{2+\sin x}}$$

4. Consider the function  $f(x) = \ln(x^3 - 1) + 2$ , defined for  $x > 1$ .

(a) Find an explicit formula for the inverse function  $f^{-1}(x)$ .

(b) What are the domain and range of  $f^{-1}$ ?