Worksheet 3: Wednesday 9/6

Acknowledgment: Worksheets for this class are adapted from the worksheets made by Amy Dai, themselves being adapted from those of Jeffrey Kuan, former GSIs of this class.

Key Points:
After 9/6 Wednesday's lecture, you should be able to:

- Check whether a function is one to one, and if it is, find the inverse function
- Simplify expressions using the law of logarithms

Exercises:

1. Let $f(x) = x^5 + x^3 + x$, which you may assume is 1-to-1 (can you see why?). Find $f^{-1}(3)$ and $f(f^{-1}(2))$.

2. If $g(x) = 3 + x + e^x$, find $g^{-1}(4)$. Again, you may assume g is 1-to-1, can you see why?

3. Evaluate the following expressions:

   (a) $\log_3 27$

   (b) $\ln(1/\sqrt{e})$

   (c) $\log_4(2/\sqrt[5]{4})$

   (d) $5^{\log_5 3}$

4. What is $f^{-1}(2)$ for each function? Find an expression for f^{-1}.

$$f(x) = \frac{1}{3}(x-1)^7 + 2$$

$$f(x) = \frac{x+3}{2x+1}$$