$\star\,$ means Advanced problem.

Section 1.3 and 1.4

1. Find the inverse function of the following

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

(b) $y = \frac{1+e^x}{1-e^x}$
(c) $f(x) = 2x + \ln(x)$
(d) $y = x^3 + 2$
(e) $\star y = 2^{10^x}$

- 2. Write the expressions as the logarithms of a single quantity
 - (a) $2\ln(x) + \frac{1}{2}\ln(x+1)$ (b) $\frac{1}{3}[2\ln(x+3) + \ln(x) \ln(x^2 1)]$
- 3. Write the expressions as a sum, difference, or multiple of logarithms

(a)
$$\ln(\sqrt{x^2+1})$$

(b) $\ln(x\sqrt[3]{x^2+1})$
(c) $\ln\left(\frac{3x(x+1)}{(2x+1)^2}\right)$

4. Solve the equations for x without a calculator.

- (a) $3^{x^2-5x-5} = \frac{1}{3}$ (b) $\ln(2x-1) = 3$ (c) $e^{3x-4} = 2$ (d) $\ln(x) - \frac{1}{2}\ln(4x+4) = 0$ (e) $\star e^{ax} = Ce^{bx}$ (Hint: rewrite $C = e^c$ where c is a constant.)
- 5. Solve the equation for θ
 - (a) $\sin^2(\theta) 1 = 0$ (b) $\cos^2(\theta) + \sin(\theta) = 1$ (c) $\star 2\cos^2(\theta) - \cos(\theta) = 1$