Homework Math 140
Lecture 7
Will be quizzed Thursday Feb 28

Problem 1 *(Textbook page 408, problems 3-8). Find the exact value of each expression.*

1. $\log_5 125$.
2. $\log_3 \frac{1}{27}$.
3. $\ln\left(\frac{1}{e}\right)$.
4. $\log_{10}\sqrt{10}$.
5. $e^{\ln 4.5}$.
6. $\log_{10} 0.0001$.
7. $\log_{1.5} 2.25$.
8. $\log_5 4 - \log_5 500$.
9. $\log_2 6 - \log_2 15 + \log_2 20$.
10. $\log_3 100 - \log_3 18 - \log_3 50$.
11. $e^{-2\ln 5}$.
12. $\ln\left(\ln e^{e^{10}}\right)$.

Problem 2 *(Textbook, page 409, problem 27-36) Solve each equation for x. Using a calculator give an ($\approx$) answer in decimal notation. Using calculator verify your approximate solutions.*

1. $e^{6-4x} = 6$.
2. $\ln(3x - 10) = 2$.
3. $\ln(x^2 - 1) = 3$.
4. $e^{2x} - 3e^x + 2 = 0$.
5. $2^{x-5} = 3$.
6. $\ln x + \ln(x - 1) = 1$.
7. $e^{3x+1} = k$.
8. $\log_2(mx) = c$.
9. $e - e^{-2x} = 1$.
10. $10(1 + e^{-x})^{-1} = 3$.
11. $\ln(\ln x) = 1$.
12. $e^{e^x} = 10$.
13. $e^{2x} - e^x - 6 = 0$.
14. $\ln(2x + 1) = 2 - \ln x$.

Problem 3 *(Textbook, page 410, problems 59-64) Find the inverse function.*

1. $y = ln(x + 3)$.
2. $y = 2^{10^x}$.
3. $f(x) = e^{x^3}$.
4. $y = (\ln x)^2$, $x \geq 1$.
5. $y = \log_{10}\left(1 + \frac{1}{x}\right)$.
6. $y = \frac{e^x}{1+2e^x}$.

Problem 4 *Find the inverse function. You are asked to do the algebra only; you are not asked to determine the domain and range of the function or its inverse.*

- $f(x) = 3x^2 + 4x - 7$, *where* $x \geq -\frac{2}{3}$.
- $f(x) = 2x^2 + 3x - 5$, *where* $x \geq -\frac{3}{4}$.
- $f(x) = ax^2 + bx + c$, *where* $x \leq -\frac{b}{2a}$.
- $f(x) = \frac{2x+5}{x-4}$, $x \neq 4$.
- $f(x) = \frac{3x+5}{2x-4}$, $x \neq 2$.
- $f(x) = \frac{ax+b}{cx+d}$, $x \neq -\frac{d}{c}$, $ad - bc \neq 0$, $cx + d \neq 0$.
- $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$.
- $f(x) = 2^{2x} + 2^x - 2$.
- $f(x) = 3^{4x} - 5 * 3^{2x} + 4$, $x \leq \log_3\sqrt{\left(\frac{5}{2}\right)}$.