Math 127
Exam 4 Practice Problems

1. Given the tables below, find the following:

| x | 0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| f(x) | 1 | 5 | 8 | 4 | 0 |

| x | 0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| g(x) | 2 | 6 | 5 | 9 | 7 |

   (a) $\left(\frac{f}{g}\right)(8)$
   (b) $(f \circ g)(2)$
   (c) $(g \circ g)(2)$
   (d) $f^{-1}(5)$
   (e) $f(g^{-1}(9))$

2. Determine whether or not the following functions are one-to-one. You must justify your answer to each part.

   (a) $f(x) = 3x - 5$
   (b) $f(x) = x^3 - x$
   (c) $f(x) = 3|x| - 2$
   (d) $g(x) = -\dfrac{1}{2x}$

3. Use algebra to find the inverse of each of the following functions:

   (a) $f(x) = 5x - 4$
   (b) $f(x) = \sqrt{x - 4}$
   (c) $f(x) = \dfrac{5x}{3 - x}$
   (d) $f(x) = \dfrac{2x - 3}{3x + 4}$

4. Suppose you have \$2,000 to invest.

   (a) Find the amount you would have after 5 years if you deposit your \$2,000 in an account that pays 6% annual interest compounded monthly.
   (b) Find the amount you would have after 5 years if you deposit your \$2,000 in an account that pays 5% annual interest compounded continuously.
   (c) Find the amount of time it would take your initial investment to double if you invested it in an account that pays 4% annual interest compounded quarterly.
   (d) Find the interest rate that would be required for your initial investment to double in 7 years if it were invested it in an account whose annual interest is compounded continuously.

5. Translate each of the following expressions into exponential form:

   (a) $\log_5 x = y$
   (b) $\log_z 5 = y$
   (c) $\log_y x = 5$

6. Find the *exact* value of each of the following:
   (a) $\log_2 1(1)$
   (b) $\log_7(0)$
   (c) $\log_2(\frac{1}{8})$
   (d) $\log_3(27)$
   (e) $\ln(e^2)$
   (f) $\log .0001$
   (g) $\log_9(27)$
   (h) $7^{\log_7(\pi)}$
7. Use properties of logarithms to expand the following expression:
   $\log\left(\dfrac{x^4z^2}{\sqrt[3]{y}}\right)$
8. Use the properties of logarithms to write the following as a single logarithm:
   $\dfrac{3}{2}\log_b x^3y^4 - \dfrac{2}{3}\log_b x^4y^3 - 2\log_b xy$
9. Solve the following equations (give exact answers whenever possible):
   (a) $e^{3x-2} = e^{4-5x}$
   (b) $9^{2x} = 27(3)^{2x+1}$
   (c) $\log_2(3x^2-3) = \log_2(x^2+x)$
   (d) $\log_5(x^2+21) = 2$
   (e) $\log_2(2x) + \log_2(x-3) = 3$
   (f) $\log(\sqrt[4]{x+1}) = \dfrac{1}{2}$
   (g) $e^{2x-1} = 3$
   (h) $4^{2x-1} = 3^{5x}$
10. Use the change of base formula to approximate the following:
    (a) $\log_5 10$
    (b) $\log_9 12$
    (c) $\log_{15} 7$