HW #3 Kerry Ojakian's MTH 30 Class Due Date: Thursday May 1 (at the beginning of class)

General Instructions:

- Homework must be stapled, be relatively neat, and have your name on it. All work and answers should be on this sheet.
- Use tutors, work with other students, but ... don't copy!

The Assignment

1. Graph the function, find its asymptotes, and find its domain and range:

$$g(x) = 2 + \frac{1}{(x-3)^5}$$

Also, describe its end behavior, and use arrow notation to describe the behavior at the undefined value.

2. Sketch $f(x) = 10^x$ and $g(x) = \log_{10}(x)$ on the same axes (you may scale the y-axis). What are the asymptotes of each graph? Find any two points that are symmetric across the line y = x.

- 3. For the function $f(x) = \frac{3x^2}{x^2 9}$, do the following:
 - (a) Determine the end behaviour and find plicity. horizontal asymptotes.
 - (b) Find the *y*-intercept. (d) Find the vertical asymptotes.
 - (c) Find the *x*-intercepts with their multi- (e) Make a sketch of the graph.

4. Let
$$f(x) = \frac{(2x^2 + x)(x - 3)}{(x + 5)(x^2 + x - 2)}$$

- (a) Evaluate f(3), f(0), and f(-1).
- (b) Determine the values of x for which the function is undefined.
- (c) Determine the values of x for which the function is defined.
- (d) What is the domain of the function?
- (e) For which inputs to the function is the output 0?
- (f) Find the values of x such that f(x) = 0.

- 5. Evaluate the following expressions:
 - (a) $\log_2(16)$
 - (b) $\log_2(\frac{1}{16})$
- 6. Use the properties of logarithms to expand the following expressions.

(a)
$$\log_b(3x^2y^3)$$
 (b) $\log_8\frac{x^{\frac{1}{2}}}{y^3}$

7. Use the properties of logarithms to condense the following expressions.

(a)
$$\log x + \log 5 =$$
 (b) $\log_8 x + 3 \log_8 y =$

8. Solve each.

(a) $\log_5(x-2) = \log_5 3$ (b) $(\log_5 x) - 2 = \log_5 3$

9. Solve. $8^{1-x} = 4^{x+2}$

10. Solve (expressing your answer using logarithms). $7^{2x-1} = 3^{x+2}$