Math 100 – College Algebra Exam III

Monday July 17, 2006

Name: Instructor:

SHOW ALL NECESSARY WORK AND SIMPLIFY ALL ANSWERS COMPLETELY!

1. (8 pts) (a) Find the critical values for the inequality $x^2 - 30 > -x$.

(b) Solve the inequality.

2. (8 pts) (a) Find the critical values for the inequality $\frac{x+3}{x+1} \geq 4$.

(b) Solve the inequality.

3. (6 pts) Find $(f \circ g)(x)$, where $f(x) = x^2 - 2x + 7$ and $g(x) = 4x + 3$.

4. (6 pts) Find $f^{-1}(x)$, where $f(x)=\dfrac{x-5}{2x+7}$.

5. (4 pts) Find $\log_2 128$.

6. (4 pts) Convert $2^5 = 32$ to a logarithmic equation.

7. (6 pts) Express as a single logarithm: $5\log_a(x)-8\log_a(y)+7\log_a(z)$

8. (6 pts) Express as a sum in terms of $\log_a(y)$ and $\log_a(z)$: $\log_a\left(\sqrt[7]{\dfrac{y^5 z^7}{z^{-7}}}\right)$

9. (8 pts) Solve: $3^x = 2^{x+1}$

10. (8 pts) Solve: $\log_5(5x+20) - \log_5(x) = 3$

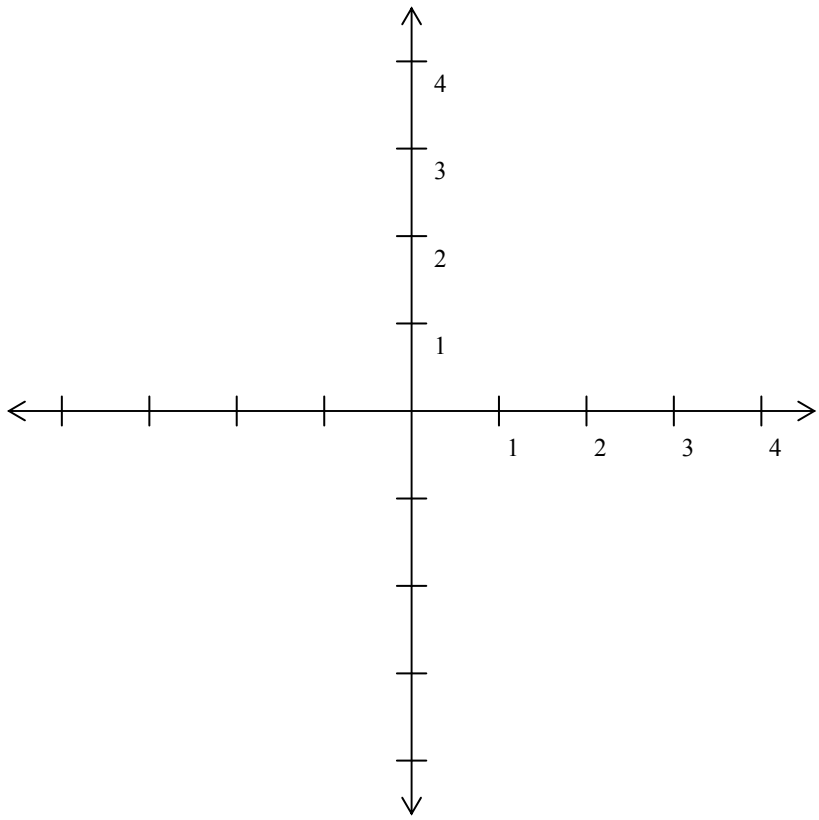
11. (6 pts) Simplify: $e^{4\ln(x+1)}$

12. (15 pts) $f(x) = 3^{x-1} - 2$

(a) Given that $g(x) = 3^x$ has $y = 0$ as its horizontal asymptote, find the horizontal asymptote for f (use your knowledge of shifts).

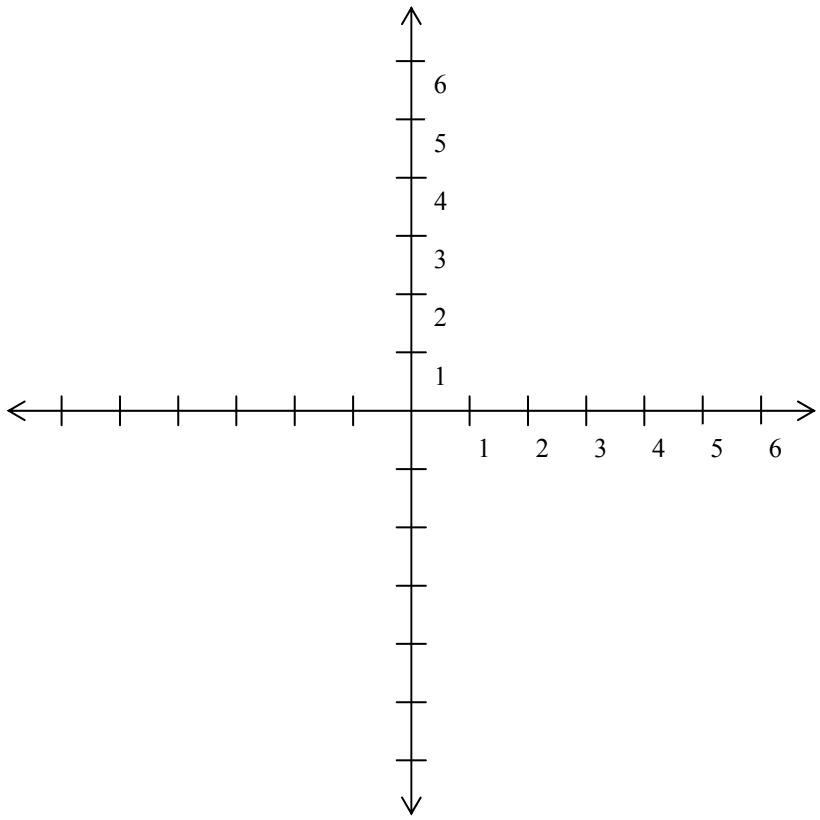
(b) Find the x and y intercepts.

(c) Graph f. Make sure to label the intercepts and asymptotes.



13. (15 pts) $f(x) = \dfrac{x+1}{x^2 - 9}$

(a) Find all asymptotes.

(b) Find the x and y intercepts.

(c) Graph f. Make sure to label the intercepts and asymptotes.