Math 100 – College Algebra Final Exam

Friday July 28, 2006

Name: Instructor:

SHOW ALL NECESSARY WORK AND SIMPLIFY ALL ANSWERS COMPLETELY!

1. (6 pts) Simplify: $\left(\dfrac{81a^7b^{-11}c^{-4}}{4a^5b^{-3}c^5}\right)^3$

2. (5 pts) Add: $\dfrac{5}{x+3}+\dfrac{7}{x^2-9}$

3. (4 pts) Find the domain: $f(x)=\dfrac{x}{x^2-(\pi+e)x+\pi e}$

4. (8 pts) Write an equation of the line passing through the point $(2,-3)$ and perpendicular to the line $y-\dfrac{1}{5}x=80$.

5. (4 pts) Given $f(x)=x$ and $g(x)=x^3-27$, find: $(fg)(4)$

Hint: this is <u>not</u> composition.

6. (6 pts) Simplify and write answer in the form of $a+bi$: $\dfrac{3+7i}{1+i}+\dfrac{2-i}{1+i}$

7. (4 pts) Find all solutions of $x^2+169=0$.

8. (6 pts) For $f(x)=x^2+8x+18$, find the vertex.

9. (10 pts) Given $x^2 - 12x > -36$,

(a) find the critical values.

(b) find the solution interval(s).

10. (5 pts) Given $f(x) = \dfrac{x-1}{x-3}$ and $g(x) = x - 5$, find $(f \circ g)(x)$.

11. (5 pts) Given $f(x) = \dfrac{9x+2}{3x-5}$, find $f^{-1}(x)$.

12. (8 pts) Solve: $\sqrt{x+25} - x = 5$

13. (7 pts) Find the quotient $Q(x)$ and the remainder R for $\left(x^3 - 6x^2 + 11x - 6\right) \div (x+5)$.

14. (6 pts) Solve: $\log_2(x-2) + \log_2(x) = 3$

15. (4 pts) Multiply the following matrices (SHOW YOUR WORK).

$$\begin{bmatrix} 2 & 0 \\ 9 & 5 \end{bmatrix} \begin{bmatrix} 3 & -4 \\ 6 & 7 \end{bmatrix}$$

16. (5 pts) Solve the following system of equations (using any method you choose).

$$\begin{aligned} x + 3y &= 10 \\ 4x + 13y &= 42 \end{aligned}$$

17. (4 pts) Write a matrix equation for the following system of equations (i.e. $AX = B$).

$$\begin{aligned} 2x - 3y + 2z &= 2 \\ x + 4y - z &= 9 \\ -3x + y - 5z &= 5 \end{aligned}$$

18. (6 pts) Solve the following system of equations (using any method you choose).

$$\begin{aligned} 2x - 3y + 2z &= 2 \\ x + 4y - z &= 9 \\ -3x + y - 5z &= 5 \end{aligned}$$

Hint: The inverse of the coefficient matrix is given by $A^{-1} = \dfrac{1}{36}\begin{bmatrix} 19 & 13 & 5 \\ -8 & 4 & -4 \\ -13 & -7 & -11 \end{bmatrix}$