Math 100–College Algebra Final Exam
Friday July 29, 2005

Name:

Instructor:

Show All necessary work and simplify all answers completely!

1. (5 pts) Simplify: $\left(\frac{12x^2y^{-5}z^{11}}{6x^3y^{-2}z^5}\right)^2$

2. (4 pts) Add: $\frac{3}{x+5} + \frac{7}{x^2-25}$

3. (5 pts) Find the domain of the function: $f(x) = \frac{2x}{3x^2-8x-3}$

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

5. (6 pts) Given $f(x) = 2x - 10$ and $g(x) = 2x^2 - 3x$, find $(f - g)(2)$ and $(fg)(1)$

6. (5 pts) Simplify and write the answer in the form of $a + bi$: $\frac{2-i}{4+3i} + \frac{4}{4+3i}$

7. (5 pts) Find all solutons of $\mid 2x + 3 \mid = 5$

8. (5 pts) Find the vertex of the graph of $f(x) = x^2 - 8x + 12$.

9. (5 pts) Solve the equation $\sqrt{4x + 5} = x$

10. (5 pts) Find the quotient $Q(x)$ and the reminder $R(x)$ for $\frac{x^3+2x^2+x+1}{x+1}$

11. (10 pts) Given $x^2 - 5x \leq -4$

   (a) find the critical values

   (b) find the solution interval(s)

12. (5 pts) Given $f(x) = \frac{x}{x^2+1}$ and $g(x) = x + 2$,find $(f \circ g)(x)$

13. (5 pts) Given $f(x) = \frac{2x+1}{x+2}$, find $f^{-1}(x)$

14. (5 pts) Solve $\log_2(x + 3) + \log_2(x) = 2$

15. (5 pts) Multiply the following matrices (Show your work)

$$\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix} \begin{bmatrix} -2 & 1 & -3 \\ 4 & 2 & -6 \end{bmatrix}$$

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

$$2x + 3y = 5$$

$$x + y = 2$$

17. (5 pts) Convert the following system of equation into a matrix equation(i.e. $AX = B$)

$$2x + y - z = 1$$

$$4x - 2y + z = 7$$

$$x - y \quad = -3$$

18. (5 pts) Solve the following system of equations (using any method you prefer)

$$x + y - z = 1$$

$$x + y + z = 3$$

$$x - y - z = -1$$

19. (5 pts) Find the partial fraction decomposition of $\frac{1}{x^2-4x+3}$