Math 44 **Practice Final** Name: _____
Spring 2009 **Instructor: Michelle Moreno**

Instructions. (points) For the final you will need to show all necessary work to receive full credit. Read the directions for each problem carefully and make sure that you answer all parts of each question. You may use your calculator to check only.

1. Expand and simplify the following expressions:

a) $(a+b)(a-b)$

b) $x^2y^3(xy^2+1)$

c) $(3a+2b)^2$

2. Solve the following by factoring:

a) $3x^2-8x=3$

b) $9y^2-1=0$

c) $(x+2)(x^2-6x+8)=0$

3. Solve the following by completing the square:

a) $x^2+3x=5$

b) $2x^2-4x-10=0$

c) $2x^2+3x=3$

4. Simplify the following rational expressions:

a) $\dfrac{15x^2y}{5xy}$

b) $\dfrac{14xz^2}{7x^2z^2}$

5. Perform the indicating operation and simplify:

a) $\dfrac{2x}{x^2-3x+2}+\dfrac{2x}{x-1}-\dfrac{x}{x-2}$

b) $\dfrac{x+1}{2x+4}-\dfrac{x^2}{2x^2-8}$

c) $\dfrac{\dfrac{1}{x^2}+\dfrac{2}{x}}{\dfrac{1}{x^2}-\dfrac{3}{x}}$

6. Use the properties of exponents to simplify the following:

a) $x^{1/5}x^{1/3}$

b) $\dfrac{y^{1/3}}{y^2}$

c) $\dfrac{z^2 z^{4/5}}{z^3}$

7. Solve the following equations involving radicals (check your solution):

a) $\sqrt{5x-6} = 2$

b) $\sqrt[4]{10y+2} = 2\sqrt[4]{2}$

c) $\sqrt{x+2} = \sqrt{4-x}$

8. Simplify the following radical expressions:

a) $\sqrt[4]{2y} \cdot \sqrt[4]{8y^3}$

b) $\sqrt{(x+y)^2} \cdot \sqrt{9(x+y)}$

c) $\dfrac{\sqrt{7}-\sqrt{2}}{\sqrt{2}+\sqrt{7}}$

9. Solve the following absolute value equations and inequalities:

a) $|x-3| = 4$

b) $\left|\dfrac{x}{3} - 4\right| = 5$

c) $\left|\dfrac{3}{4}x + 3\right| \leq 6$

d) $4 + 2\left|\dfrac{3}{4}x + 3\right| \geq 6$

10. Find the equation of the line going through the points (4,5) and (-3, 6).

11. Find a decimal approximation for $\log_2(13) = x$

12. Solve the following problems involving logs and exponentials:

a) $\log(3x + 1) = \log(x + 7)$

b) $\log_x(16) = 2$

c) $3^{2x} = 4^x$

d) $3^{x^2-3x} = 81$

13. Rewrite the following logarithm as a single log: $\frac{1}{3}\log(w) - 3\log(x) + \log(y) - \frac{3}{4}\log(z)$

14. A plane can fly 300 miles in the same time as it takes a car to go 120 miles. If the car travels 90 mph slower than the plane, find the speed of the plane.

15. The population of Arcata is growing at an annual rate of 3.2%. If the current population of Arcata is 15,000 people, how long will it take for Arcata's population to reach 25,000 people?