Exam 1   Algebra & Trig   9/19/2003

Each problem is worth 10 points. Show adequate justification for full credit. Please circle all answers and keep your work as legible as possible. Don't Panic.

1. Simplify the expression $\left(x^{-6}yz^{2} \right)^{-2}$ and write it without any negative exponents.

2. Solve the system of equations:

$$3a - b = 11$$
$$-a + 2b = -12$$

3. Solve the equation $\dfrac{x}{4} = \dfrac{x+3}{6} - 1$.

4. Solve the inequality $|3x + 2| < 1$, graph the solution on a number line, and write the solution in interval notation.

5. Divide $\dfrac{5+i}{3-2i}$ and write the answer in standard form.

6. Show that a quadratic equation of the form $ax^2 + bx + c = 0$ has solutions

$$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

7. Biff is an Algebra & Trig student at a large state university, and he's having some trouble. Biff says "So there was this problem on the homework, and it said we should say if 3 was a solution to the equation $x^2 - 2^x = 1$. But I totally don't know how to solve that equation, and I tried to for like three hours, because the teacher said that problem was about something really important and it'd probably be on the test. So now the test is Monday and I'm gonna have to waste my whole weekend trying to figure out how to solve it, because when I went to his office hours he wasn't even there."

Explain clearly to Biff how he should go about answering the question.

8. Find all solutions to the equation $3y^{2/3} + 2y^{1/3} - 8 = 0$.

9. If the length and width of a 4- by 2-inch rectangle are each increased by the same amount, the area of the new rectangle will be twice that of the original. What are the dimensions of the new rectangle (to two decimal places)?

10. a) Write an absolute value equation that has $x = 2$ and $x = -2$ as solutions.

b) Write an absolute value equation that has $x = a$ and $x = b$ as solutions.

Extra Credit (5 points possible):

For what values of x and y will the inequalities
$$2x + y \geq 2$$
$$x - 3y \leq 1$$
both be satisfied? [Hint: Start by solving the system as if there were equals signs rather than inequalities, then see what you can do from there.]