Practice Exam 1 Algebra & Trig 2/26/2003

Each problem is worth 10 points. For full credit provide complete justification for your answers.

1. Simplify $5y - 2y[7 - 3(y - 2)]$.

2. Solve $5x - 9 = 3x + 7$.

3. Rewrite $-5 < x \leq 2$ both in interval notation and on a number line.

4. Simplify $(8x^{12}y^{-6})^{1/3}$ and write the answer using positive exponents only.

5. Solve $2x - 3y = 7$
$3x - y = 7$

6. Write $\frac{3+4i}{2-i}$ in standard form.

7. Solve $|2x + 1| < 5$ and express the solution both with interval notation and on a number line.

8. Solve $\sqrt{2w + 5} - w = 1$.

9. Buzz is a precalc student at the University of Iowa who's having some trouble. He says "Whoa, man, this math class is kicking my butt. There was this question on our test that was, like, $x^3 + x^2 - 5x + 3 = 0$, and we were supposed to tell if $x = 1$ was a right answer for it. But, like, I never saw in High School how you solve ones where there's x^3 in it, so I had no chance at all!"

Explain to Buzz, clearly enough that he can understand, how he could have answered the question even without knowing how to solve a third degree equation.

10. Consider equations of the form $x^2 - 2x = c$. For what values of c will such an equation have real solutions?

Extra Credit (5 points possible): An earthquake emits a primary wave and a secondary wave. Near the surface of the Earth the primary wave travels at about 5 miles per second, and the secondary wave travels about 3 miles per second. From the time lag between the two waves arriving at a given seismic station, it is possible to estimate the distance to the quake. Suppose a station measures a time difference of 16 seconds between the arrival of the two waves. How far is the earthquake from the station?