Math 222	Name:
Prof. Peter Cholak and Juan Migliore	Friday, January 26

Be sure to carefully write up your answers. It is suggested that you first write out a draft of your proposed questions and then carefully rewrite that draft to get your final version. You do *not* have to write the answers on this sheet of paper, but please staple all sheets together before turning your quiz in.

1. Show by induction that $n^4 - 4n^2$ is divisible by 3 for all $n \ge 1$.

2. In the "real" world, we are used to the fact that a power of a non-zero number is again non-zero. We will later see that this fact is not true in all worlds. Show that the complex numbers do behave normally in this regard. Precisely, let z be an arbitrary complex number and suppose that we have $z^k = 0$ for some positive integer k. Show that z must be zero. (You may use the fact that you know it to be true for real numbers.)

3. Find *all* the cube roots of -8i. Write them in the form a + bi. Be sure to show your work.