Homework due February 23

1. You need to know: two forms of the Fundamental Theorem of Algebra (Theorem P3 and Theorem P4), Proposition P5 (with proof), Proposition P6 (with proof), Proposition P7.

2. (a) Find the (complex) roots of the quadratic equation

$$x^2 - 5x + 7 - i = 0.$$

   (b) Find the roots of the quartic equation $x^4 + x^2 + 1 = 0$.

   (c) Find the roots of the equation $2x^4 - 4x^3 + 3x^2 + 2x - 2 = 0$, given that one of them is $1 + i$.

3. Factor $x^5 + 1$ as a product of real linear and quadratic polynomials.

4. If the roots of the equation $x^3 - x - 1 = 0$ are α, β, γ find a cubic equation having roots α^2, β^2, and γ^2.