Homework # 6 (Due Monday, February 17)

- Read pp. 51 – 58 in the textbook.
- Do all the problems below:

1. a) Use long division to divide polynomial $x^4 - 2x^3 - 4x^2 - 10x + 3$ by $x^2 - 4x + 1$.

   b) Use part a) to find all solutions of
   $$x^4 - 2x^3 - 4x^2 - 10x + 3 = 0.$$

2. Find numbers a and b so that polynomial $x^4 - 3x^3 + 3x^2 + ax + b$ can be divided by a polynomial $x^2 - 3x + 2$.

3. a) Verify that $\alpha = 1 + i$ is a root of $p(x) = 8x^3 - 17x^2 + 18x - 2$.

   b) Use part a) to find all the roots of the polynomial.

4. a) Solve the equation $z^5 + z^4 + z^3 + z^2 + z + 1 = 0$
   (Hint: apply formula for geometric progression first.)

   b) Generalize part a) and find all the roots of the equation $z^n + z^{n-1} + \ldots + z^2 + z + 1 = 0$, $n \geq 1$.

5. Solve quadratic equation:

$$x^2 - (2 + 4i)x - 5i - 4 = 0$$

(Hint: Quadratic formula works!)