## Homework due on Wednesday, February 16

Read carefully sections 4.2-4.5 in the book. Solve the following problems.

**Problem 1.** Let n be a natural number. Verify the identity:

$$a^{n+1} + b^{n+1} = (a+b)(a^n + b^n) - ab(a^{n-1} + b^{n-1}).$$

Use it to prove that if a, b are real numbers such that a + b and ab are integers then  $a^n + b^n$  is an integer for every natural number n.

**Problem 2.** Prove that

$$\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

for any natural number n.