<u>Homework # 2 (due Monday, January 27)</u>

- Read Chapter 2 in the textbook.
- <u>Need to know</u>: definitions of rational and irrational numbers, statements and proofs of propositions 2.2, 2.3, 2.4, 2.5 from Chapter 2, of 2.6 **from** class notes.
- Do the following problems.

1. Use the problem 2 from homework 1 to prove that $\sqrt{5}$ is irrational.

2. Prove that $\sqrt{21}$ is irrational.
   (Hint: please think! Do <u>not</u> consider 21 different cases!)

3. True or false? If true, provide a proof. If false, provide a counterexample.
   a) If n is an integer and n^3 is divisible by 3, then n is also divisible by 3.
   b) If n is an integer and n^2 is divisible by 18, then n is divisible by 18.

c) The product of two irrational numbers is always irrational.

d) $2 + \sqrt{3} - \sqrt{7 + 4\sqrt{3}}$ is irrational.