HOMEWORK ASSIGNMENT NO. 3

(1) Prove that $\sqrt[3]{2}$ is irrational. What do you need to know in order to show that this is true? Recall that proved in class that if n^2 is even, then n is even. Is this sufficient? What do we need to prove instead in order to get at why $\sqrt[3]{2}$ is irrational? How about $\sqrt[r]{2}$?

(2) Find (all) real numbers a and b such that $(a+bi)^2 = \frac{1+\sqrt{3}i}{1-i}$. I want an exact value of a and b and not an approximation. Show me that your answer is correct.

BTW when I ask Google for `sqrt((1+sqrt(3)i)/(1-i))` it responds : $0.723943423 + 0.943461437i$ and Wolfram alpha says: $\sqrt{\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+i\sqrt{3}\right)}$ but neither of these two answers is satisfying because the first one is an approximation and the second isn't in the form $a+bi$.

(3) Give an explanation why each of the following statements in the list below is either true or false.

  (a) All of the statements below are true.
  (b) None of the statements below are true.
  (c) All of the statements above are true.
  (d) One of the statements above are true.
  (e) None of the statements above are true.
  (f) None of the statements above are true.