DISCRETE MATHEMATICS, CLASS EXERCISE 4

(1) Use predicate logic to prove that the following argument is valid. Use the predicate symbols shown.
   "Every ambassador speaks only to diplomats, and some ambassador speaks to someone. Therefore, there is a diplomat." $A(x), S(x, y), D(x)$.

(2) Prove that for all integers, n, if n^5 is even than n is even.

(3) Let a, b and c be integers. Prove that if $a|b$ and $b|c$ then $a|c$.

(4) Prove that $\sqrt[5]{7}$ is irrational.

(5) Prove or disprove the statement: The product of a rational number and an irrational number is irrational.

(6) Prove the statement: "The square root of any irrational number is irrational".