

CS 381 Solutions to Homework 1

1. If $m + n$ is odd, then one of m and n is odd, and the other is even.
Hence $m \times n$ is an odd number multiplied by an even number, which is even.

2. Suppose that x is not irrational i.e. rational.

Then $x = m/k$ for some integers m and k .

Hence $x^n = (m/k)^n = m^n/k^n$.

Since m and k are integers, m^n and k^n are integers.

Hence x^n is rational, contradicting the premise.

Hence x must be irrational.

3(a) Call 8 pints pail A and 5 pints pail B.

To get 1 pint in A do the following:

(1) Fill A.

(2) Fill B from A. 3 pints remain in A.

(3) Empty B.

(4) Empty A into B. 3 pints are in B and A is empty.

(5) Fill A.

(6) Fill B from A. 6 pints remain in A.

(7) Empty B.

(8) Fill B from A. 1 pint remains in A.

3(b) We will never get 1 pint in A or B.