CS 225 Assignment 2 - Part 2
Christopher Matian
ID: 933308644

Set 4.6

12) a and b are rational; b != 0; r is irrational number

a + br is irrational.

c = a + br

Assume that C is also rational so a, b, c are rational and b != 0

So, r = (c - a) / b

(c - a) numerator is rational and b is also rational.

- Contradicts the assumption that r is irrational. So c must be irrational

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16)

a, b, c are odd integers

z is rational…….. z = m/n

Step 1) a(m/n)^2 + b(m/n) + c = 0

Step 2) am^2 + bmn + cn^2 = 0

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ODD NUMBER DEFINITIONS
a = 2h+1; b = 2k+ 1; c= 2j + 1
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Step 3) (2h + 1)m^2 + (2k+1)mn + (2j+1) n ^2 = 0

Step 4) (2hm^2 + 2kmn + 2jn^2) + m^2 + mn + n^2 = 0

Step 5) 2(hm^2 + kmn + jn^2) = - (m^2 + mn + n^2)

Step 6) m^2 + mn + n^2 = - 2 (hm^2 + kmn + jn^2)

When m = 2 and n = 3

2^2 + (2)(3) + 3^2 = 19

Contradiction because an odd is not an even. Therefore z is irrational.

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28) Proof by Contradiction

p = mn is even
q = n is even, m is even

p - > q is the equivalent to ~q -> ~p

So…. suppose that m and n are odd defined below:

m = 2k + 1
n = 2j + 1

mn = (2k + 1)(2j + 1)

= 4kj + 2k + 1

= 2(2kj + k + 1)

= 2n + 1 which is an odd integer