Re: −−− −−− Irrational solutions

Source: http://sci.tech−archive.net/Archive/sci.math/2008−02/msg01101.html

- *From*: Deep <deepkdeb@xxxxxxxxx>
- *Date*: Wed, 6 Feb 2008 12:08:29 −0800 (PST)

On Feb 5, 3:48 am, quasi <qu...@xxxxxxxx> wrote:

> On Mon, 4 Feb 2008 17:30:56 −0800 (PST), Deep <deepk...@xxxxxxxxx>
> wrote:
>
>> On Feb 4, 7:12 am, quasi <qu...@xxxxxxxx> wrote:
>>
>>> On Sun, 3 Feb 2008 05:24:36 −0800 (PST), Deep
>>> <deepk...@xxxxxxxxx>
>>> wrote:
>>>
>>>> On Feb 2, 11:34 pm, quasi
>>>> <qu...@xxxxxxxx> wrote:
>>>>
>>>>> On Sat, 2 Feb 2008
>>>>> 18:04:43 −0800 (PST),
>>>>> Deep
>>>>> <deepk...@xxxxxxxxx>
>>>>> wrote:
>>>>>
>>>>>> Consider
>>>>>> the
>>>>>> following
>>>>>> equation
>>>>>> under the
>>>>>> given
>>>>>> conditions.

R^(1/2) = n^(k−2)[S/T] (1)

where S = m^(k−1) − Am^(k−3) + Bm^(k−5) − .. − k (2)

T = n^(k−1) − An^(k−3) + Bn^(k−5) − ... ..− k (3)

mn = 1

(4)

Condition: R is positive rational but not a perfect square. k is a prime > 3, A, B, .. divisible by k

Assertion:
m = u^(1/2)
where u is
rational but
not a perfect
square
will satisfy
(1)

You need to declare the restrictions on _all_ your variables.

Let's see what you forgot ...

Variables: R, S, T, k, m, n, A,B, ...

Restrictions:

R is a positive rational but not a perfect square.

S,T are what? Presumably positive reals, but you didn't say.

k is a prime, k > 3

mn = 1, but m,n are what? Presumably positive reals,
but you didn't say. You did state an asserted _conclusion_
about m,n but not a

declaration of their types in the hypothesis.

A,B, ... are "divisible by k". Thus, A,B, ... are presumably integers, but you didn't say. Without further specification, one would have to assume arbitrary integer multiples of k, possibly zero, possibly negative. If that's not what you intended, you have to make your restrictions clear.

You are often careless in this regard, and several times in the past I've made the same objection. You need to declare the types and restrictions on your variables -- _all_ of them.

Although I can see in advance that for any of the likely specifications for the missing declarations, your assertion is false, there's no sense trying to provide a counterexample until you fully specify all the conditions. Thus, before exposing the hopelessness of your almost certainly false assertion, please fix your problem statement. Also, you have a typo in condition (2).

Thank you very much for your comments.
Your comments are valid and I
must be careful in defining the problem.
Now kindly note the
following:

1. All the variables are real and each > 0
2. Each of the variables A, B, ... is an
integer and divisible by k..
3. Prime k > 3
4. S and T are defined in terms of m and n so
they are also real.
5. mn = 1
6. My goal is to prove that only m = u^(1/2)
will satisfy the
condition R^(1/2) is irrational
and R is rational given u is rational but not
a perfect square.

I thank you for your helpful comments and I
look forward to hearing
from you about the correctness of the
assertion.

The assertion is false. Moreover, counterexamples can be
created
almost arbitrarily. Here's one counterexample, done with one
eye
closed (in other words, there was no need to get clever) ...

Let k = 7.

Let n = the positive root between 1 and 1.1 of the equation

−223*n^14
+3171*n^12
−17563*n^10

+47712*n^8
−65968*n^6
+43813*n^4
−10941*n^2
+1
= 0

Then n is approximately equal to 1.001383065.

Let m = 1/n.

Then m is approximately .9986188452.

Let S = m^6 − 7m^4 + 28m^2 − 7

Then S is approximately 14.95304266.

Let T = n^6 − 7n^4 + 14n^2 − 7

Then T is approximately 1.008273500.

Let R = (n^10)*(S/T)^2

Then R is _exactly_ 223.

Thus, all the conditions of your hypothesis are satisfied, but
m,n are
of degree 14 over Q, hence your asserted conclusion fails.

So that takes care of your latest flawed conjecture.

Let me make some general remarks. This is one of dozens of such
systems of equations you've posted to sci.math, and in almost every
case, your assertion had no chance of being true. My recommendation is
to stop wasting time with these meaningless wild goose chases.

In a previous thread, I asked you what these mysterious systems of
equations were all about, but you dodged the question. However a
recent thread of yours gave away the object of your secret quest −−
you're hunting FLT. In principle, there's nothing wrong with that,
except that the particular strategy you're stuck on is doomed to
failure −− guaranteed, perpetual failure. There has to be a more
productive use of your time and energy.

I would stop fooling with these systems of equations. Not only do they
not work, but you have no idea _why_ they fail. Instead, why not start
a serious self−study of

(1) elementary number theory −− divisibility, congruences
(2) abstract algebra −− groups, rings, fields
(3) linear algebra −− brief review of vector spaces, linear maps
(4) field theory −− galois theory
(5) algebraic number theory

Give yourself a year or two, maybe more. Speed is not as important as
mastery, so however long it takes. But all of the above

self−study
courses should be done with full rigor −− in other words,
proofs,
not just assertions.

Assuming you complete the above, you can then pursue

(6) commutative algebra
(7) algebraic geometry

at which point you will have some serious power tools for dealing with
the kinds of problems that you seem to be interested in.

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Thank you very much for your comments. It is always nice to have someone else's view points. I welcome your friendly advice. It will be very helpful. If your time and interest permit kindly reply to the following:
1. If S, T, n are approximate then why should R be exact?

No, they are _all_ exact. S,T are defined exactly in terms of n, and n is defined exactly as the only real root in a specified interval for a specified equation with rational coefficients. The value of n is uniquely determined by that specification, so in that sense, it's exact. However n cannot be expressed as a finite algebraic expression using the standard arithmetic operations, radicals, and rational constants. Still, as specified by its defining equation and bounding interval, n is exact.

2. Why m = sqrt(q) where q is a positive rational cannot be a solution of (1)?

Maybe it can, but the point is, m doesn't _have_ to be of that form.

You asserted that m,n must have that form. A single counterexample (for example, the one I provided), suffices to show that your assertion is false.

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I was under the impression that the chapter is closed because you adequately explained the situation and also gave a counter example. Because of my lack of understanding I am asking you for a little clarification and would appreciate your reply. Kindly note I am referring to (1) which generated this discussion. I repeat:
R^(1/2) = n^(k−2)* S/T (1), R is a positive rational but not a perfect square.
For simplicity you chose k = 7 ok. Nothing else is given.
How did you get the equation −223n^14 + 3171n^12 − ... ... +1 = 0 (2)
True, (2) will give 14 values of n.
Did you imply that only one will be real positive and have value between 1 and 1.1?
Your simple reply will be very helpful.

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