

Re: help with diophantine equation

Source: <http://sci.tech-archive.net/Archive/sci.math/2005-08/msg04141.html>

- *From:* john_ramsden@xxxxxxxxxxxxxxxx
 - *Date:* 22 Aug 2005 11:26:27 -0700
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mechmech wrote:

>

> I have this equation: $3*n*n = 3*k*k + 73*k + 14$

>

> I am interested in the most efficient way to get the solution

> (which is $n=32$ and $k=22$) besides the trial and error method

> ($k=1,2,3,\dots$, then calculate n) because for big enough numbers

> n and k , the trial and error is useless.

It's a difference of squares, i.e. after multiplying every term by 12 it can be rearranged as:

$$(6.k + 73)^2 - (6n)^2 = 5161$$

which means the left hand side can be factored as follows:

$$(6.(k - n) + 73).(6.(k + n) + 73) = 5161$$

So the most efficient method of solution is to list every way in which 5161 can be expressed as the product of two factors (including both negative!):

+− 1, +− 5161

+− 13, +− 397

+− 397, +− 13

+− 5161, +− 1

and equate linear factors to each pair and see if the result gives integers k and n . (This will be the case if any only if $k - n$ and $k + n$ are both integers of the same parity, i.e both odd or both even.)

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- *Follow-Ups:*
 - ◆ [*Re: help with diophantine equation*](#)

Re: help with diophantine equation

◇ *From:* Bill Dubuque

◆ ***Re: help with diophantine equation***

◇ *From:* Ignacio Larrosa Cañestro

• ***References:***

◆ ***help with diophantine equation***

◇ *From:* mechmech

• Prev by Date: ***Re: Aleksandr Ilin: a nwe Fermat proof?***

• Next by Date: ***Re: infinity***

• Previous by thread: ***help with diophantine equation***

• Next by thread: ***Re: help with diophantine equation***

• Index(es):

◆ ***Date***

◆ ***Thread***