

Re: help with diophantine equation

Source: <http://sci.tech-archive.net/Archive/sci.math/2005-08/msg04341.html>

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 - *Date:* Tue, 23 Aug 2005 19:33:29 +0200
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En el mensaje:1124735187.920841.259920@xx, john_ramsden@xxxxxxxxxxxxxx <john_ramsden@xxxxxxxxxxxxxx> escribió:
> 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
>> ($k=1,2,3,...$, 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.)

Hi mechmech,

Apart from $(n, k) = (32, 22)$, there is another solution, as you can see following john_ramsden message.

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Best regards,

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• **References:**

- ◆ **help with diophantine equation**
◇ From: mechmech
- ◆ **Re: help with diophantine equation**
◇ From: john_ramsden

- Prev by Date: **Re: Bedeviled by the .999~ = 1 "debate"**
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