

## Re: Distance between a point and $y = ax^2 + bx + c$

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2006-11/msg00303.html>

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- *From:* Badger <[badger@xxxxxxxxxxxxxxxx](mailto:badger@xxxxxxxxxxxxxxxx)>
  - *Date:* Wed, 01 Nov 2006 06:06:40 -0500
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On Wed, 01 Nov 2006 01:13:56 EST, Magnus <[mao19883@xxxxxxxxxxxxxxxx](mailto:mao19883@xxxxxxxxxxxxxxxx)> wrote:

Thanks. I still need to solve that cubic. The equation is the same as the one here:  
<http://home.student.uu.se/mao19883/files/cubic.jpg>  
Those "square root"-terms make it possible for certain points (x0, y0) to become imaginary  
----> three imaginary roots.

Am I to conclude that I have solved it incorrectly in Maxima?

That would seem to be the case. It looks to me like you have the correct cubic (after you set the constant term of the quadratic to 0), but I don't know why you wanted to show that long closed form solution.

Taking the second example from another post you made in this thread:

$y = x^2$  and the point (0, 1)

The three roots of the cubic are 0 and  $\pm \sqrt{2}/2$ , thus the two (symmetric) closest points on the curve are at  $(\pm \sqrt{2}/2, 1/2)$ , distance =  $\sqrt{3}/2$  (assuming my algebra is correct).

If you haven't already done so, this is easy to check by hand so you can use it to validate the Maxima solution.

Since I don't know anything about Maxima, I don't know how you need to specify the cubic and a specific set of coefficients to Maxima for solution. Try giving Maxima a *\*specific\** cubic to solve, rather than asking for that big closed form solution first.

HTH

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