

Re: intersection of parabola and line

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- *From:* frank <frank.degeeter@xxxxxxxx>
 - *Date:* Thu, 01 Nov 2007 10:50:42 -0700
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On 1 nov, 17:01, "Philippe 92" <nos...@xxxxxxxxxxxx> wrote:

frank wrote :

On 28 okt, 21:07, "Philippe 92" <nos...@xxxxxxxxxxxx> wrote:

frank wrote :

Hi there,

I am looking for
aruleandcompassconstruction of the
intersection
points (if they exist) of a line L with
aparabolaP with given
directrix and focus.

See figure :<http://i21.tinypic.com/v3opxh.gif>

Dear Philippe,

Thank you for this magnificent construction. You filled me with awe!

I didn't want to ...

Allow me just to inquire whether you made up this construction from

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scratch or you just happened to know it (or knew where to find it) – in the first case, I would be interested to learn where I could learn your art, in the latter I would like to know where I could find similar exercises.

I don't remember from where comes my construction. However I would not be surprised if I found it by myself !
Sure it is known, and/or can be found as exercises in class books...

It comes from a page that I designed for my web site last year, and that I didn't have the time to finalize and publish, about a few constructions related with conic sections, the first chapter is about parabolas.

This was motivated by a few problems on math forums at that time.

For the way I solved it and for my sources, they come from my old class books, plus a few books about projective geometry, triangle geometry etc... (all in french).

And also the "cut-the-knot" web site is a source of inspiring problems, some with solutions as well.

See also Wolfram and Wikipedia and search through Google, and also a very interesting site, but in dutch language.

Some abstract of my favorites :

<http://www.cut-the-knot.org/content.shtml><http://mathworld.wolfram.com><http://www.pandd.demon.nl/>

This last one is in dutch language, but I found there simple proofs of Poncelet porism, Descarte/Soddy formula etc...

<http://www.mathcurve.com/>

A very complete encyclopedia of curves, unfortunately in french, but gives a lot of usefull properties of curves.

For the present problem, I think my line of thoughts about it (find the points) was to find the center of some circle which ... As I know that the parabola is the locus of centers of circles tangent to directrix and going at focus.

This is related with Apollonius problem (find circle tangent to 3 objects, objects being independantly lines/circles/points).

So having the construction method of Apollonius problems in mind, may be this lend me to the solution of the present problem.

But I really don't remember now what was my exact thinking line last year when I solved it...

Thank you for motivating me to publish that page on my web site.

It is now at http://chehip.free.fr/themes_en/parabole1.html

Please be patient when loading the page as it uses dynamic applet for drawing the figures, so you can drag points to change the parabolas, lines etc...

Regards.

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Philippe C., mail : chehip+n...@xxxxxxx
site :<http://chehip.free.fr/> (recreational mathematics)

Thanks again. Actually, the construction I asked you about was a question in a book that I used in my secondary (Latin–Maths) education, now more than 30 years ago. I remember that we were not asked to solve it (perhaps our teacher did not know the answer either). I purchased a second hand version of the very book a few weeks ago (I like to do some maths for fun), and I had a go at the problem, but got frustrated after thinking for some two weeks about it. That is why I posted the problem. The solution you gave (including its proof), and the way you got at it reassure me of the fact that I could never ever have come up with it myself. In fact, I am quite convinced that nobody could have solved the problem using the maths that we learned at school. For example, we were not familiar with the relationship that leads to $PH^2 = PF \cdot PF'$ in your proof; I had to look that up (is <http://www.cut-the-knot.org/pythagoras/PPower.shtml> the right reference?).

Thank you for the very useful pointers to websites you gave. The french and dutch are no problem whatsoever: I am Belgian. Thanks as well for having added that page to your website. Perhaps you should add the proofs as well.

I'll leave you now, because I have a battle to conduct. At Hastings. And it is all your fault.

Sincerely yours,

Frank

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