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ABOUT SOME HISTORICAL EXTREME TABLES AND THEIR PROOF

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ANNOTATION

This article presents methods to prove the Geron issue, which has many practical significance

Keywords: function, triangle inequality, derivative of a function, extremum values of a function, stationary point

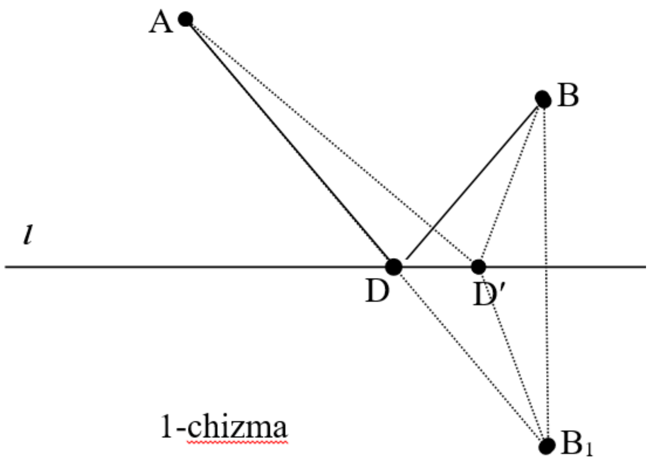
The question of Geron is considered one of the extreme, which is characterized by its statement and solution in simple ways, as well as its applied significance.
In this article, we will show the methods for proving the following geometric issue, which will be followed by the name of Geron.
The question of Geron. Two that lie on one side of a straight line in the plane A and B points are given. Find such a point in a straight line that from this point A va B let the sum of the distances to the points be the smallest .
Bu masalani geometrik usulda quyidagicha hal qilishi mumkin .
B_1 point l in relation to a straight line V let the point be a symmetrical point (drawing 1). A and B we connect the points AB_1 is a straight line and l straight line intersection point D we mark with. We show that this point is the point that is being sought.
Optional from reality D for a point that is different from a point

$$AD'+D'B = AD'+D'B_1 > AB_1 = AD+DB$$

$$DB = DB_1,\ D'B = D'B_1$$

and according to the triangle inequality,

$$AD'+D'B_1 > AB_1$$



1-chizma

The issue was resolved.

Now we will solve this issue using another method, namely the coordinate method.

OY on the axis $A(0;a)$ is the point and OXY in the plane $B(d;b)$ let the points are given (drawing 2). OX on the axis $D(x;0)$ we get a point. Without it AD and OB lengths of cuts

$$AD=\sqrt{a^2+x^2}$$
$$DB=\sqrt{b^2+(d-x)^2}$$

will.

$$AD+DB=\sqrt{a^2+x^2}+\sqrt{b^2+(d-x)^2}$$

The resulting issue $f(x)=\sqrt{a^2+x^2}+\sqrt{b^2+(d-x)^2}$ (1)

comes to the appearance analytical. The solution to the issue (1) is equivalent to the question of finding the smallest value of a function. At the point where this function reaches a minimum according to the farm theorem, the derivative is Zero [2],

$$f'(x)=\left(\sqrt{a^2+x^2}+\sqrt{b^2+(d-x)^2}\right)=\frac{x}{\sqrt{a^2+x^2}}+\frac{d-x}{\sqrt{b^2+(d-x)^2}};$$

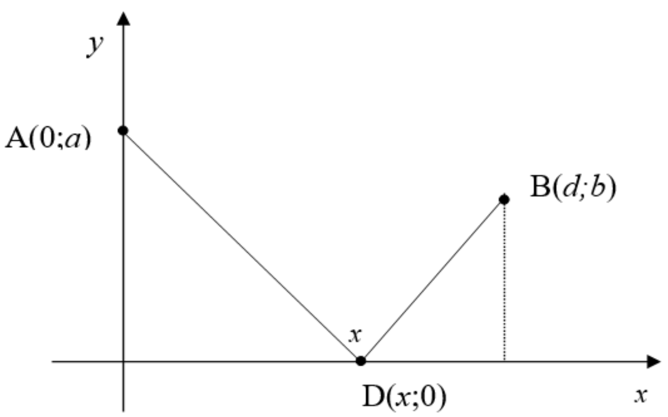
$$\frac{x}{\sqrt{a^2+x^2}}+\frac{d-x}{\sqrt{b^2+(d-x)^2}}=0$$

Solving this equation, $x=\dfrac{ad}{a+b}$ we find that.

Hence the value of the argument that gives the function a minimum value $x=\dfrac{ad}{a+b}$ that.

From this D coordinate of the point $\left(\dfrac{ad}{a+b};0\right)$ indicates that at the point.

This issue in another way, $ABB'A'$ it is also possible to prove using the hossas of the equilateral Trapezium (in this A' point A of the point, B' point B of the point l symmetric point relative to a straight line).



2-chizma

With the help of the Geron issue, many issues of practical importance can be solved [3] as well as the following interesting issues.

Issue 1. A given angle and is located inside it C let the point is given. On different sides of the corner A and B points can be found, ABC the peremeter of the Triangle will be the smallest.
Issue 2. On the sides of a given angle A and B points can be found that are given in C for the point

$$CA + AB + BD$$

the sum of the cuts will be the smallest.

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