6th South African Regional
ACM Collegiate Programming Competition

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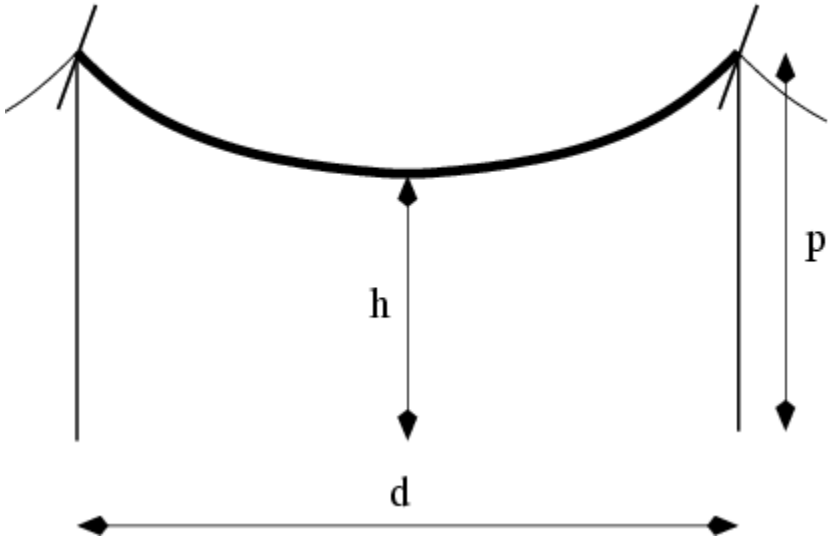
Problem D – Yellow balloon
The Cable Guy

In the spirit of entrepreneurship, you have been running a very successful second-hand telephone cable business. However, your clients are becoming more particular by the day, to the extent that they now order cables of specific lengths.

The problem with this new requirement is that it is difficult to tell how long a cable is while it is still hanging from the telephone poles. You can easily measure the distance (on the ground) between the poles, and you can measure the distance from the ground to the lowest point of the cable. Here's a diagram:



Fortunately you've paid attention in the maths classes, and you remember that cables hang in a very particular shape (assuming that the cable does not stretch under its own weight, your "supplier" uses only the highest quality cables). The functional form of this shape is called a catenary, and defines the shape of the cable as

$$f(s) = a * \cosh(s / a),$$

where cosh(x) is defined as

$$\cosh(x) = 0.5*(\exp(x) + \exp(-x)).$$

Note that $f(s)$ defines the "height" of the cable, with its lowest point at $f(0) = a$.

The shape in which the cable hangs is thus completely described by the catenary function *f(s)* above, once you have computed the value of a. You are given the three parameters necessary to find a, namely h (height of cable above ground at its lowest point), p (height of the pole) and d (distance between the two poles).

Having found a, you must then compute the arc length of f(s), i.e. the length of the cable.

Input

Your input will consist of records of the following format:

<pole_height> <pole_spacing> <cable_height>,

where pole_height corresponds to p in the diagram above, pole_spacing corresponds to d, and cable_height corresponds to h.

Your input may contain any number of records of this form.

You only have to compute the length of a single cable span between two successive poles.

Output

For each input record, you must output the length of the cable described by the input record. Your answer must be rounded to three decimal places.

Sample Input

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10 20 8
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Sample Output

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20.524
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