

## Problem A. Ant and Sticks

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            2 seconds  
Memory limit:         1024 megabytes

You are given two distinct points on an infinite table,  $A = (A_x, A_y)$  and  $B = (B_x, B_y)$ .

You also have  $M$  sticks, each of which is a line segment of length  $W$ . You may place the sticks anywhere on the table, with arbitrary position and orientation. The sticks may overlap. However, no stick may contain point  $A$  or point  $B$ .

An ant starts at  $A$  and wants to reach  $B$ . It may walk anywhere on the table, but it cannot cross any stick.

You want to place the sticks so that the length of the ant's shortest path from  $A$  to  $B$  is as large as possible.

If it is possible to block the ant completely, so that no path from  $A$  to  $B$  exists, then the answer is  $-1$ .

Otherwise, let  $L$  be the supremum<sup>†</sup>, over all valid stick placements, of the length of the shortest path from  $A$  to  $B$ . If there exists a placement for which this value is attained, then  $L$  is simply the maximum. If it is not attained by any single placement, but can be approached arbitrarily closely, you must still output  $L$ .

<sup>†</sup>The supremum (least upper bound) of a set of real values is the smallest real number that is greater than or equal to every value in the set. It may or may not be attained by some value in the set.

### Input

The input is given in the following format:

$T$
$A_x A_y B_x B_y M W$
$\vdots$

- All input values are integers.
- $1 \leq T \leq 10^4$
- $0 \leq A_x, A_y, B_x, B_y \leq 10^9$
- $1 \leq M, W \leq 10^9$
- It is guaranteed that  $(A_x, A_y) \neq (B_x, B_y)$ .

### Output

For each test case:

- print  $-1$  if the ant can be blocked completely;
- otherwise print one real number — the value  $L$  defined above.

Let  $X$  be the correct answer and  $Y$  be your output. Your output is accepted if and only if

$$|Y - X| \leq 10^{-6} \cdot \max(1, |X|).$$

## Examples

standard input	standard output
2	-1
0 0 1 1 343 434	1425074478.231629371643066
4 5 786331192 707731892 1 639711202	

## Note

**Test case 1:** It can be proven that it is possible to block the ant completely by placing the sticks optimally.