

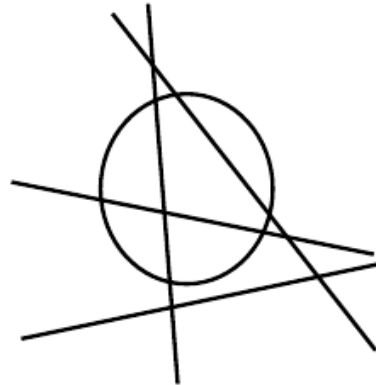
Given a circle, and a list of lines, how many parts has the circle been cut into? In the example shown here, four lines cut the circle into five parts.

Input

There will be multiple test cases in the input. Each test case will begin with four integers, r ($1 \leq r \leq 1,000$), x , y ($-1,000 \leq x, y \leq 1,000$), and n ($0 \leq n \leq 1,000$), where r is the radius of a circle, x and y are the coordinates of the center of the circle, and n is the number of lines. On each of the next n lines will be four integers, x_1 , y_1 , x_2 , and y_2 ($-1,000 \leq x_1, y_1, x_2, y_2 \leq 1,000$). These describe a line passing through (x_1, y_1) and (x_2, y_2) . Note that we are interested in the whole line, not just the segment between (x_1, y_1) and (x_2, y_2) .

In any test case, no more than two lines will intersect at any point, and no lines will be tangent to the circle. No lines within any test case will be coincident.

End of input will be indicated by a line with four '0's.



Output

For each test case, output a single integer, indicating the number of parts that the circle is cut into.

Sample Input

```
1 0 0 2
0 0 0 1
-1 0 20 0
16 1 7 4
-15 -9 14 -11
-4 30 -3 -20
-20 12 -10 7
17 10 31 0
0 0 0 0
```

Sample Output

```
4
5
```