

# The Path Through the Mountains

---

**Time Limit:** 1.0s    **Memory Limit:** 256M

---

## KODTÜ6 Question E

### The Path Through the Mountains

---

Execution time limit is 1 seconds.

Runtime memory usage limit is 256 megabytes.

The surface of the Earth in a mountainous area can be represented as a broken line. The vertices of the broken line are located at the points  $(x_1, y_1)$ ,  $(x_2, y_2)$ , ...,  $(x_N, y_N)$ , where  $x_i < x_{i+1}$ .

An ordinary mountain mage is at the point  $(x_1, y_1)$  and really wants to get to the point  $(x_N, y_N)$ . However, he can only move on foot. He can walk on the surface of the Earth (i.e. along the broken line). Or he can create a bridge in the air and walk along it. The bridge can connect two vertices of the broken line: the bridge cannot start and end at a vertex other than the broken line, and the bridge cannot pass underground (including it cannot be a tunnel in the mountain), but some part of the bridge can pass on the surface of the earth. The length of the bridge cannot be greater than  $R$ . In total, the mage can build no more than  $K$  bridges. After passing the bridge, it (the bridge) dissolves into thin air. What is the smallest distance the magician will have to travel to find himself at point  $(x_N, y_N)$ ?

### Input

---

The program must first read a natural number  $N$  ( $2 \leq N \leq 200$ ); then a natural number  $K$  ( $1 \leq K \leq 100$ ) - the maximum number of bridges; then an integer  $R$  ( $0 \leq R \leq 10000$ ) - the maximum possible length of the bridge. Then the coordinates  $(x_1, y_1)$ ,  $(x_2, y_2)$ , ...,  $(x_N, y_N)$ . All coordinates are integers not exceeding 10000 in absolute value; for all  $i$  from 1 to  $N - 1$ ,  $x_i < x_{i+1}$  is satisfied.

### Output

---

The program should output one number - the minimum length of the path that the magician will have to travel (both on the ground and on bridges). Output the answer with an accuracy of 5 digits after the decimal point.

### Examples

---

**Input:**

```
5 2 5
0 0
2 2
3 -1
4 1
5 0
```

**Output:**

```
6.47871
```