Project Euler #222: Sphere Packing

What is the length of the shortest pipe, of internal radius R $\mathbf{mm}$, that can fully contain n balls of radii r_i $\mathbf{mm}$ where $0 \leq i \leq n-1$?

Give your answer in micrometres (10^{-6} $\mathbf{m}$) rounded to the nearest integer.

Input Format

The first line of each test file contains two-separated integers R and n.
The next line contains n space-separated integers $r_0, \ldots, r_{n-1}$.

Constraints

- $2 \leq R \leq 10^6$.
- $1 \leq n \leq 4 \cdot 10^5$.
- $\frac{7R}{13} < r_i \leq R$.
- r_i are pairwise distinct.

Output Format

Print your answer in one line.

Sample Input 0

```
2 1
2
```

Sample Output 0

```
4000
```

Sample Input 1

```
5 2
3 4
```

Sample Output 1

```
13325
```

Sample Input 2

```
100 5
61 62 63 64 65
```

Sample Output 2

```
530707
```