

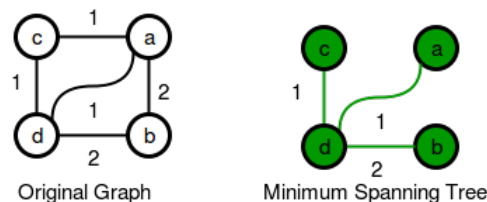
# Minimum MST Graph



Allison loves graph theory and just started learning about [Minimum Spanning Trees\(MST\)](#). She has three integers,  $n$ ,  $m$ , and  $s$ , and uses them to construct a graph with the following properties:

- The graph has  $n$  nodes and  $m$  undirected edges where *each edge has a positive integer length*.
- No edge may directly connect a node to itself, and each pair of nodes can only be directly connected by *at most* one edge.
- The graph is *connected*, meaning each node is reachable from any other node.
- The *value* of the minimum spanning tree is  $s$ . Value of the MST is the sum of all the lengths of all edges of which are part of the tree.
- The sum of the lengths of all edges is as small as possible.

For example, let's say  $n = 4$ ,  $m = 5$  and  $s = 4$ . We need to construct a graph with 4 nodes and 5 edges. The value of minimum spanning tree must be 4. The diagram belows shows a way to construct such a graph while keeping the lengths of all edges is as small as possible:



Here the sum of lengths of all edges is 7.

Given  $n$ ,  $m$ , and  $s$  for  $g$  graphs satisfying the conditions above, find and print the minimum sum of the lengths of all the edges in each graph on a new line.

**Note:** It is guaranteed that, for all given combinations of  $n$ ,  $m$ , and  $s$ , we can construct a valid graph.

## Input Format

The first line contains an integer,  $g$ , denoting the number of graphs.

Each of the  $g$  subsequent lines contains three space-separated integers describing the respective values of  $n$  (the number of nodes in the graph),  $m$  (the number of edges in the graph), and  $s$  (the value of the MST graph).

## Constraints

For 20% of the maximum score:

- $1 \leq g \leq 100$
- $2 \leq n \leq 10$
- $1 \leq m \leq 50$
- $1 \leq s \leq 20$

For 50% of the maximum score:

- $1 \leq g \leq 100$
- $2 \leq n \leq 50$
- $1 \leq m \leq 2000$
- $1 \leq s \leq 200$

For **70%** of the maximum score:

- $1 \leq g \leq 100$
- $2 \leq n \leq 10^5$
- $1 \leq m \leq 10^{10}$
- $1 \leq s \leq 10^6$

For **100%** of the maximum score:

- $1 \leq g \leq 1000$
- $2 \leq n \leq 10^8$
- $1 \leq m \leq 10^{16}$
- $1 \leq s \leq 10^{10}$

### Output Format

For each graph, print an integer on a new line denoting the minimum sum of the lengths of all edges in a graph satisfying the given conditions.

### Sample Input

```
2
4 5 4
4 3 6
```

### Sample Output

```
7
6
```

### Explanation

- Graph 1:

The answer for this sample is already explained the problem statement.

- Graph 2:

We must construct a graph with  $n = 4$  nodes,  $m = 3$  edges, and an MST value of  $s = 6$ . Recall that a connected graph with  $n$  nodes and  $n - 1$  edges is already a tree, so the MST will contain all  $m = 3$  edges and the total length of all the edges of the graph will be equal to the value of the minimum spanning tree. So the answer is **6**.