

Algorithms Lab

Exercise – Maximize it!

Your company often needs to solve simple optimization problems of two types.

$$\begin{aligned} (1) \quad & \max b \cdot y - a \cdot x^2 \\ & s.t. \ x, y \geq 0 \\ & \quad x + y \leq 4 \\ & \quad 4x + 2y \leq ab \\ & \quad -x + y \leq 1 \end{aligned}$$

$$\begin{aligned} (2) \quad & \min a \cdot x^2 + b \cdot y + z^4 \\ & s.t. \ x, y \leq 0 \\ & \quad x + y \geq -4 \\ & \quad 4x + 2y + z^2 \geq -ab \\ & \quad -x + y \geq -1 \end{aligned}$$

For any values of parameters a and b , find the optimal value.

Input The input consist of several test sets. Each test set is on a separate line, consisting of three values $p \ a \ b$, where $p \in \{1, 2\}$ is the type of the problem to solve (1 or 2) and a, b are the values of the paremeters. Both a and b are integers such that $0 \leq a \leq 100$ and $-100 \leq b \leq 100$. The input is terminated by a line containing only 0.

Output For each input, write on a single line the optimal value of the problem p with parameters a, b , rounded down to the next integer for the maximization problem, and rounded up to the next integer for the minimization problem. If there is no solution, write `no` and if there are solutions of arbitrarily high value (arbitrarily low for minimization), then output `unbounded`.

Sample Input

```
1 1 1
1 3 -3
2 1 1
2 2 1
0
```

Sample Output

```
0
no
0
-1
```