

Legendre symbol

Given 2 integers a and p ($1 \leq a, p \leq 1000000$, p is prime) calculate the [Legendre symbol](#) (a/p) .

Input

In the first line the number of test cases $t < 100000$. Then t lines with the 2 integers a and p.

Output

t lines with the Legendre symbol (a/p) .

Example

Input:

```
4
2 7
5 7
14 7
3 2
```

Output:

```
1
-1
0
1
```