

Contest Duration: 2025-05-31(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250531T2100&p1=248>) - 2025-05-31(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250531T2240&p1=248>) (local time) (100 minutes)

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G - A/B < p/q < C/D

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 625 points

Problem Statement

You are given positive integers A, B, C, D satisfying $\frac{A}{B} < \frac{C}{D}$.

Find the smallest positive integer q satisfying the following condition:

- There exists a positive integer p such that $\frac{A}{B} < \frac{p}{q} < \frac{C}{D}$.

T test cases are given, so solve each.

Constraints

- $1 \leq T \leq 2 \times 10^5$
- $1 \leq A, B, C, D \leq 10^{18}$
- $\frac{A}{B} < \frac{C}{D}$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

2026-01-02 (Fri)
05:24:59 +11:00

```
T  
case1  
case2  
:  
caseT
```

Here, case_i represents the i -th test case.

Each test case is given in the following format:

```
A B C D
```

Output

Output T lines. The i -th line should contain the answer for the i -th test case.

Sample Input 1

Copy

```
5  
3 2 2 1  
5 2 8 3  
1 2 2 1  
60 191 11 35  
40 191 71 226
```

Copy

Sample Output 1

Copy

```
3  
5  
1  
226  
4
```

Copy

Consider the first test case.

For example, if $p = 5$, $q = 3$, then $\frac{3}{2} < \frac{5}{3} < \frac{2}{1}$, so $q = 3$ satisfies the condition.

There is no positive integer less than 3 that satisfies the condition for q , so the answer for the first test case is 3.

#telegram)

2026-01-02 (Fri)
url=https%3A%2F%2Ft.coder.jp%2Fcontests%2Fabc408%2Ftasks%2Fabc408_g%3Flang%3Den&title=G%20%05.24.59%20%03C%20C%2FD)

05.24.59 ₩11.00

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