Fractions S66556_en

Write a program that reads pairs of fractions (given as four integers: `num1 den1 num2 den2`) and for each pair writes its sum, its product, and a comparison of both fractions.
First, define the following functions

```
def simplify(n,d):
    '''
      - Receives the numerator and denominator of a fraction
      - Returns the numerator and denominator of the simplified equivalent fracti
     '''

def sumfrac(n1,d1,n2,d2) :
    '''
      - Receives the numerator and denominator of two fraction
      - Returns the numerator and denominator of the simplified sum fraction
     '''

def prodfrac(n1,d1,n2,d2) :
    '''
      - Receives the numerator and denominator of two fraction
      - Returns the numerator and denominator of the simplified product fraction
     '''

def smaller((n1,d1,n2,d2) :
    '''
      - Receives the numerator and denominator of two fraction
      - Returns True if n1/d1 < n2/d2, False otherwise
     '''
```

You can use the following function that computes the GCD of two numbers:

```
def gcd(a,b):
    '''
       - Receives two integers a>0, b>0
       - Returns the greatest common divisor of a and b
     '''
    if a<b :
        a,b = b,a
    while b>0:
        a, b = b, a%b
    return a
```

Your main program **must** use these functions. You can not alter the name or parameters of the given functions.

Input

The input consists of a sequence of groups of 4 integers. Not necessarily each group of four integers will be in a single line (see the examples)

Output

Each group is to be interpreted as two fractions `num1 den1 num2 den2`, and for each group, the sum and product of the two fractions must be printed as simplified fractions, as well as a comparison. Follow the format of the examples

Sample input 1

```
2 4 1 3
3 8 54 89
39 84  95 84
41 42 33 11
 2 6 31 8
74 94 1 69
64 27 53 36
```

Sample output 1

```
2/4 + 1/3 = 5/6
2/4 * 1/3 = 1/6
2/4 > 1/3

3/8 + 54/89 = 699/712
3/8 * 54/89 = 81/356
3/8 < 54/89

39/84 + 95/84 = 67/42
39/84 * 95/84 = 1235/2352
39/84 < 95/84

41/42 + 33/11 = 167/42
41/42 * 33/11 = 41/14
41/42 < 33/11

2/6 + 31/8 = 101/24
2/6 * 31/8 = 31/24
2/6 < 31/8

74/94 + 1/69 = 2600/3243
74/94 * 1/69 = 37/3243
74/94 > 1/69

64/27 + 53/36 = 415/108
64/27 * 53/36 = 848/243
64/27 > 53/36
```

Sample input 2

```
5 4 3 2

12 24
32 16

6
12
8
16

11 11 22 23
```

Sample output 2

```
5/4 + 3/2 = 11/4
5/4 * 3/2 = 15/8
5/4 < 3/2

12/24 + 32/16 = 5/2
12/24 * 32/16 = 1/1
12/24 < 32/16

6/12 + 8/16 = 1/1
6/12 * 8/16 = 1/4
6/12 = 8/16

11/11 + 22/23 = 45/23
11/11 * 22/23 = 22/23
11/11 > 22/23
```

Sample input 3

```
1 99999999999999999
1 99999999999999998
```

Sample output 3

```
1/99999999999999999 + 1/99999999999999998 = 1999999999
1/99999999999999999 * 1/99999999999999998 = 1/999999999
1/99999999999999999 < 1/99999999999999998
```

Observation

All computations must be carried out using only integers. Using reals (e.g. real division) will not work.

Problem information

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