In the figure on the right you can see triangle ABC and its in-circle (Circle that touches all the sides of a triangle internally) and three ex-circles (Circles that touch one side internally and other two sides externally). D, E and F are centers of the ex-circles.

Given the length of the sides of triangle ABC, you will have to find the area of triangle DEF and also the total area of the three grey shaded regions.
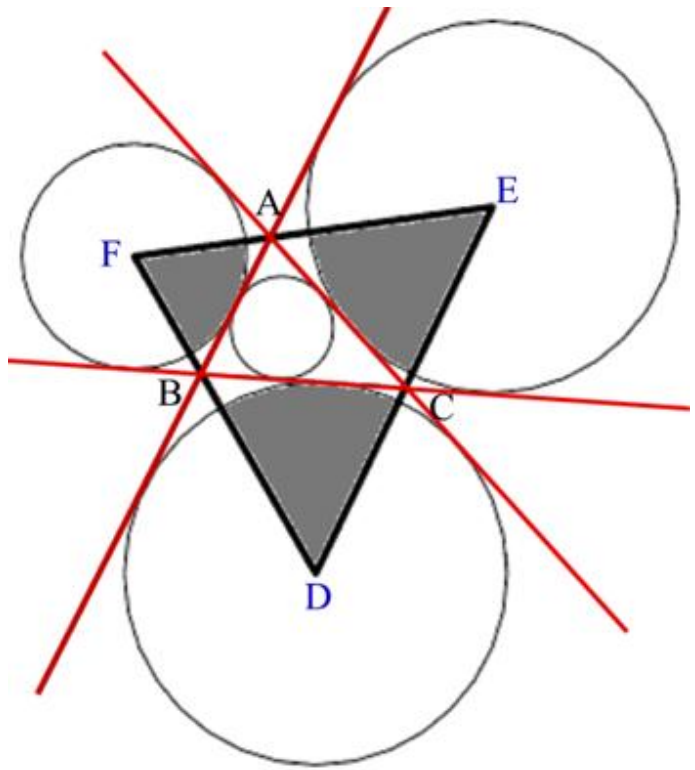
Input

The input file can contain up to 6000 lines of inputs. Each line contains three positive integer numbers a, b, c which denotes the length of the sides of the triangle ABC. You can assume that these three sides can form a valid triangle (positive area) and none of the side length is greater than 1000.

Input is terminated by a line containing three zeroes.

Output

For each line of input produce one line of output. This line contains the serial of output followed by two floating-point numbers. The first one denotes the area of triangle DEF and second one denotes the total area of the three gray shaded regions. This floating-point numbers should have two digits after the decimal point. You can assume that small precision errors will not cause difference in the printed output.

Sample Input

```
3 4 5
10 11 12
0 0 0
```

Sample Output

```
Case 1: 30.00 21.62
Case 2: 211.37 144.73
```