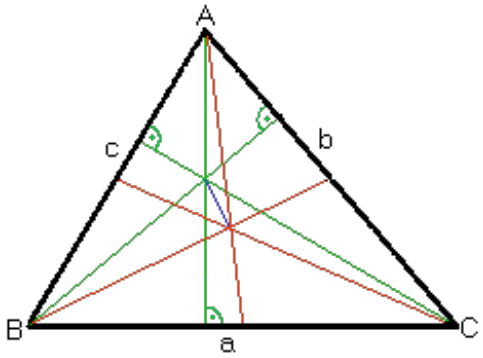
Triangle From Centroid

Given the length of side a of a triangle and the distances from the centroid (the point of concurrence of the medians - red in the picture) to all sides: a, b and c, calculate this triangle's area and the distance (blue line) from the orthocenter (the point of concurrence of the heights - green in the picture) to the centroid.



Input

In the first line integer n - the number of test cases (equal to about 1000). The next n lines - 4 floating point values: the length of side a, and distances from the centroid to sides a, b and c.

Output

n lines consisting of 2 floating point values with 3 digits after the decimal point: the area of the triangle and the distance from the orthocenter to centroid.

Example

Input:
2
3.0 0.8660254038 0.8660254038 0.8660254038
657.8256599140 151.6154399062 213.5392629932 139.4878846649

Output:
3.897 0.000
149604.790 150.275