Convex Hull

The Problem

Tomato plants are planted in the ground at various points in a garden. We wish to build a single continuous fence around the tomato plants at minimal cost. Each linear metre of fence costs $5; posts cost $1. You may assume that you do not need to leave any buffer zone around a tomato plant. You may also assume that the area enclosed by the fence will always be non-zero.

The Input

The first line of input will be a number on a line by itself which is the number of test cases to run. For each test case, the first line will be a number N ≥ 3 on a line by itself which is the number of tomato plants. The next N lines consists of a pair of non-negative integers, which are the x and y coordinates of the end points of the line segments.

The Output

For each test case, output a single line containing the cost of building the fence, rounded to two decimal places.

Sample Input	Sample Output
2 7 5 4 4 2 3 3 6 1 7 4 2 1 1 3 4 6 2 6 3 6 4 5 1	$82.61 $35.88