Equilateral triangles 4

[Award] **9 pts**

[Category] **Probability**

Assume a point D **inside** an equilateral triangle ABC of side length sqrt(3). Then we can use the three segments AD, BD and CD to build a new triangle PQR.

When point D is in the center of triangle ABC, the area of triangle PQR is sqrt(3)/4, which is the maximum value for all possible positions of D; and the circumference of PQR is 3, which is the minimum value. Moreover, when point D is close to the vertex of triangle ABC, the area of triangle PQR is close to zero; and the circumference of PQR is close to its maximum value 2\*sqrt(3).

Assuming that point D is chosen randomly (with **uniform distribution**) within triangle ABC, find the expected area and circumference of triangle PQR. Give your answers rounded to 8 digits after the decimal point.

Answer format: [expectation of area],[expectation of circumference]

(Sample input: 0.43301270,3.46410162)

[Answer] **0.32475953,3.15919003**