

Name: \_\_\_\_\_

**Directions:** All questions require explanation in English sentences.

1. [5 points] A square is divided into four equal quadrants, and the lower right quadrant is shaded. This operation is iterated forever in the lower left quadrant, as shown below. The outermost square has side length 1. What is the total area of all shaded regions?



2. [5 points] Let  $PQ$  be the diameter of a circle  $C$  and let  $R$  be a point on the circumference of  $C$ . Prove that  $\angle PRQ = 90^\circ$ . (You may use basic facts about triangles without proof.)

