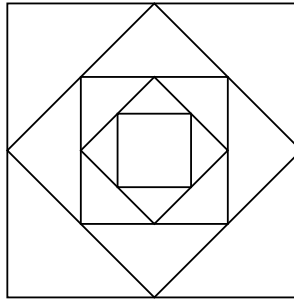


1. Suppose you are told to choose the + and – signs in the following series:

$$\pm 3 \pm 1 \pm \frac{1}{3} \pm \frac{1}{9} \pm \cdots \pm \frac{1}{3^n} \pm \cdots$$

- (a) Can you choose the signs to make the series diverge?
 (b) Can you choose the signs to make the series sum equal 3.5?
 (c) Can you choose the signs to make the series sum equal 2.25?
2. Begin with a square of unit sidelength. Inside it, inscribe a square by joining its midpoints. Continue this process indefinitely, as indicated.



Assuming you have infinite time and infinite precision, do you also need infinitely many pencils to finish the picture? What is the sum of the perimeters of all the squares?

3. Here's how to construct a Koch snowflake. Begin with an equilateral triangle of unit sidelength. Replace the middle third of each side with an equilateral triangle facing outward to obtain a twelve sided object. Now replace the middle third of *all twelve sides* by equilateral triangles. Continue this indefinitely.
- (a) What is the area of the resulting figure?
 (b) What is the perimeter of the resulting figure?