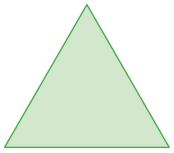
MA1020 Quantitative Literacy – Chapter 2 Quiz –Take-Home

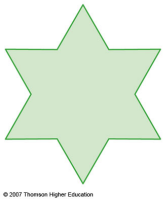
Name _____

The following is the TAKE-HOME portion of the quiz. You are NOT to discuss this problem with anyone, work with another person, or use the internet for this section. If evidence is found indicating that you have collaborated with another person or consulted the internet, you will automatically receive a score of zero.

The first stage of the Koch snowflake is an equilateral triangle. Each of the following stages is formed by removing the middle third of each side and replacing it with an equilateral triangle with no base. The first two stages of the Koch snowflace are shown. Assume the perimeter of the original equilateral triangle is 81 units.



Stage 0



Stage 1

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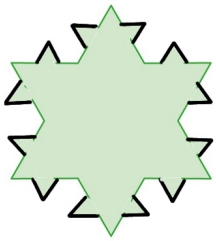
1. Construct the next stage of the Koch snowflake.



Stage 2

(over)

2. Complete the following table for each stage of the Koch snowflake.

Stage	Number of Segments	Length of Each Segment	Total Length of Perimeter
0	3	27	81
1	$12 = 4(3)$	$9 = \frac{1}{3}(27)$	$108 = \frac{4}{3}(81)$
2	$48 = 4^2(3)$	$3 = (\frac{1}{3})^2(27)$	$144 = (\frac{4}{3})^2(81)$
3	$192 = 4^3(3)$	$1 = (\frac{1}{3})^3(27)$	$192 = (\frac{4}{3})^3(81)$
n	$4^n(3)$	$(\frac{1}{3})^n(27)$	$(\frac{4}{3})^n(81)$

By construction, at each stage one segment is divided into 4 segments. Notice the $\frac{1}{3}$ results from removing the middle third. At each stage, the perimeter is $\frac{4}{3}$ the perimeter of the previous stage.