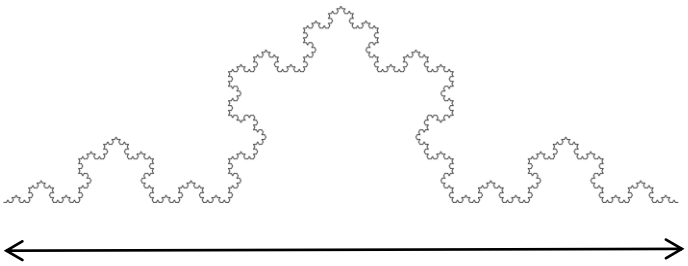
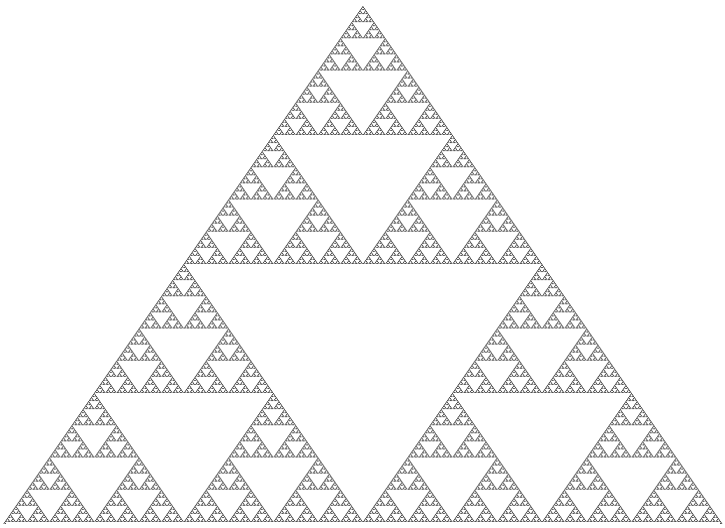
2014/15 第十届香港小学数学创意解难比赛

(决赛暨粤港澳交流邀请赛 - 数学辩论/ 解难实验)

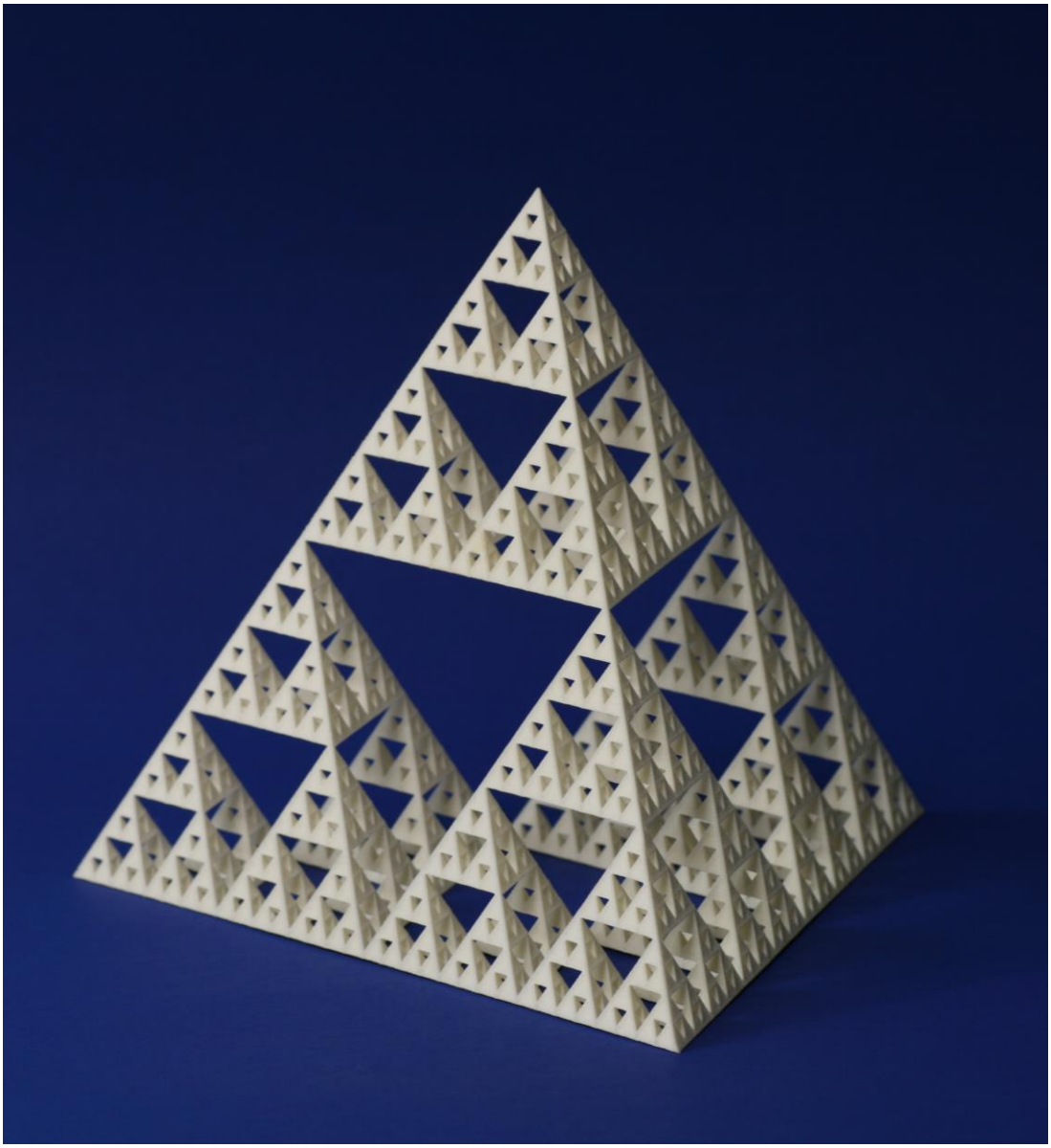
Annex 1 (图 1)



Annex 2 (图 2)



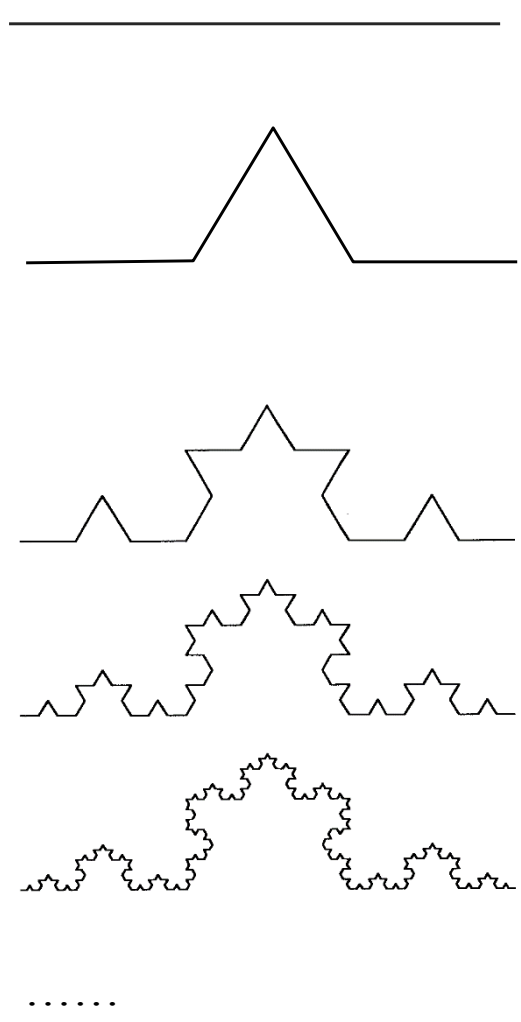
Annex 3 (图 3)



注释:

Notes:

I. 科赫曲线 (Koch curve)：



1. i. 将直线线段分成三等份。
   Cut a line segment into three equal part.
   ii. 在中间的线段画一个等边三角形。
   Form an equilateral triangle on the segment in the middle.
   iii. 将这等边三角形的底线段移去。
   Remove the base of this triangle.

2. 对图形的各个线段作(1)的各步骤以形成新的图形。
   Apply the steps in (1) to all the segments to form a new figure.

3. 在新的图形上重复 (2) – (3)。
   Repeat the step (2) – (3) in the new figure.

II. 谢尔宾斯基三角形 (Sierpinski triangle)：

1. i. 取一个等边实心的三角形。
   Take a solid-filled triangle.
   ii. 沿三边中点的连线，将它分成四个小三角形。
   Join the midpoints of the three sides to form a smaller triangle.
   iii. 去掉中间的那一个小三角形。
   Take away this smaller triangle formed in the middle.

2. 对图形的各个实心三角形作(1)的各个步骤以形成新的图形。
   Apply the steps in (1) to all the solid-filled triangles to form a new figure.

3. 在新的图形上重复 (2) – (3)。
   Repeat the steps (2) – (3) in the new figure.

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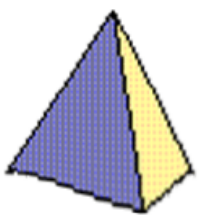
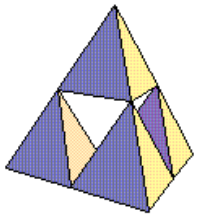
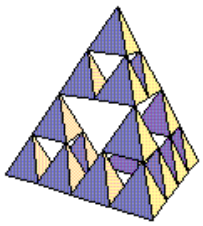
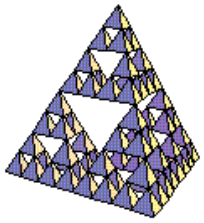
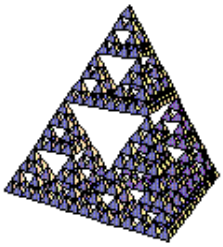
III. 谢尔宾斯基金字塔 (Sierpinski pyramid)：











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1. i. 取一个等边实心的三角金字塔。
   Take a pyramid with a triangular base.

   ii. 沿六边中点的连线，将它分成四个小三角金字塔。
   Four smaller pyramids with triangular base can be formed by joining the midpoints of the six edges.

   iii. 去掉中间的部分只留下这四个小金字塔。
   Cut away the portion in the middle leaving only these four smaller pyramids.

2. 就留下的小三角金字塔进行(1) 的各个步骤以形成新的立体图形。
   Apply the steps in (1) to all the remaining pyramids to form a new figure.

3. 在新的图形上重复 (2) – (3)。
   Repeat the steps (2) – (3) in the new figure.