For this project, you'll create a fractal, using a recursive process, as we've seen with the Koch Snowflake and the Sierpinski Gasket.

Choose a recursive process (I'll suggest some below). Start out with just one piece of graph paper, and do several of the steps to get a sense of how the process works, and whether this is creating a fractal at all (all the steps I suggest will, but if you make up your own, it may not), and if so, if it's one you want to pursue.

Once you choose a process, you'll have a sense of how big to make it. You may want to carefully (so that the lines match up) attach several pieces of graph paper together. Carefully mark out your beginning figure – since in most cases you're subdividing a figure, you'll want to start fairly large, and have a number of squares which is easy to divide. For instance, if you choose a pattern that involves dividing into thirds, then you'll want to use a number of squares that's a power of 3 (3, 9, 27, 81, 243, etc). If it involves dividing into halves, then choose a number of squares which is a power of 2.

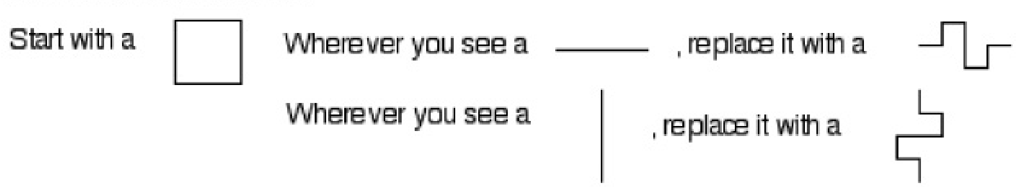
To further pursue this project, figure out the similarity dimension of the fractal (just so you know, not all fractals have fractional dimension). You can also ponder the perimeter and area, if you choose to.

Write a brief description describing the mathematics behind what you've done.

1. The square snowflake:

2. Vicsek's snowflake:

3. The Quadratic Koch Island



4. The Dragon Curve

That is, replace every line segment with the two sides of a right isosceles triangle whose base would be the line segment you're removing.

Use a flipped version of this motif for every other line segment. That is, alternate the "direction" of the point as you work through all the line segments.

Possible Points: Correctly drawing the first 3 or 4 steps of the recursion process (or however many you need for it to begin to get difficult but at the same time for you to begin to get a feel for what the actual fractal looks like) and of course writing a good clear description of the mathematics behind your work can earn up to 15 points. Adding some creativity to it can earn a few more points. If you figure out the similarity dimension, the perimeter, and/or the area, you can earn still more – up to 30 points.