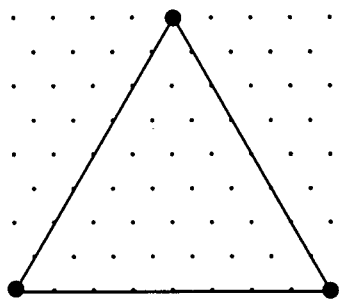
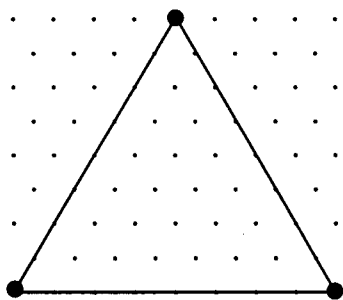


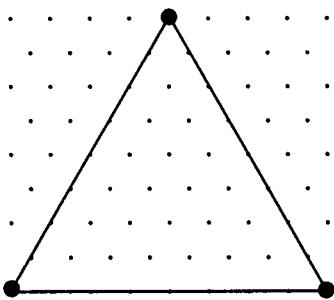
Lesson 0.1, Investigation 0.1.1: Sierpinski Triangle and Fractional Parts



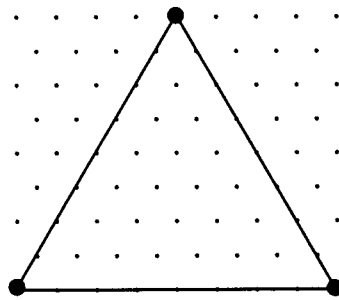
Stage 0



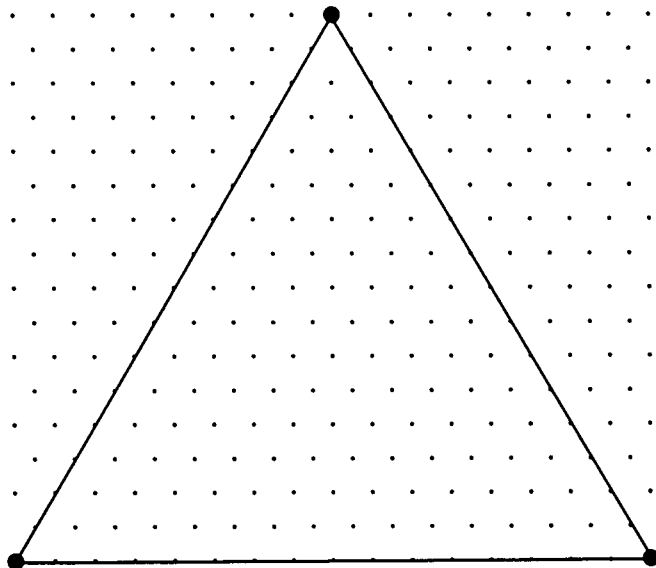
Stage 1



Stage 2



Stage 3



Stage 4

Lesson 0.1: The Same yet Smaller

In this lesson you'll review some concepts related to fractional parts. You'll learn to draw a fractal design in the investigation, and then you'll review how to add, subtract, multiply, and divide fractions.

Investigation 0.1.1: Sierpinski Triangle and Fractional Parts

Investigations are a very important part of this course. Often you will discover new concepts in an investigation, so be sure to take an active role.



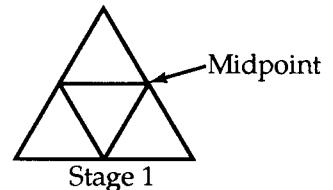
You can draw some interesting figures that have the characteristic that smaller parts added to the drawing look like the original. The procedures involved are very simple and, if you draw carefully you can create some beautiful designs. This investigation will introduce you to one such figure called the Sierpinski triangle.

You will need a pencil, a straightedge, and the isometric dot paper worksheet for this investigation.

Part 1: Drawing the Sierpinski Triangle

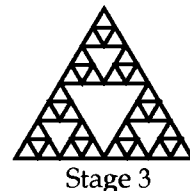
Look at the large triangle labeled Stage 0. In a fractal design, the Stage 0 figure is the starting shape. You'll make the same changes to this figure repeatedly to create the fractal design.

Stage 1 Start with the triangle labeled Stage 1. To create the Stage 1 figure, draw line segments to connect the midpoints of each side of the triangle.



Stage 2 Start with the triangle labeled Stage 2. Connect the midpoints to create the Stage 1 figure again. Next mark the midpoint of each side in each small triangle. Draw line segments to connect the midpoints in the upward-pointing triangles only.

Stage 3 Start with the triangle labeled Stage 3. Re-create the Stage 2 figure in this triangle. Next mark the midpoint of each side in each of the smallest triangles. Draw line segments to connect the midpoints in the upward-pointing triangles only. Check to see that your Stage 3 figure looks like the one at right.



Stage 4 If you want to create a Stage 4 figure, start with the large triangle in the lower half of the worksheet. First connect the midpoints of the large triangle, and continue connecting the midpoints of each smaller upward-pointing triangle at each new stage until you have 81 small upward-pointing triangles.