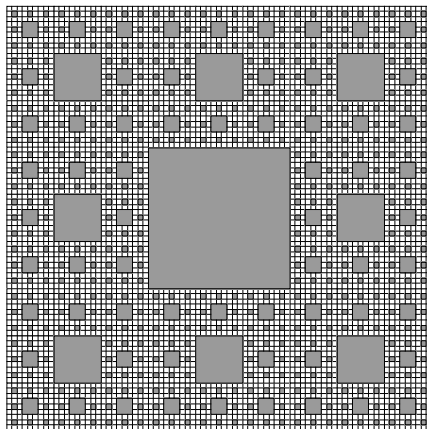


1. Below is the Sierpinski carpet (shown after 4 steps). Find the similarity dimension of the Sierpinski carpet. (I made it the same way you made in your problem set; treat the filled in parts as empty space.)



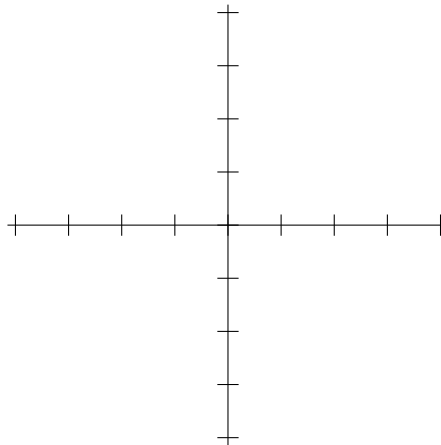
2. What points in the plane do the following complex numbers represent? Graph (and label) each one on the set of axes provided.

(a)  $2 - 3i$

(b)  $3 + 4i$

(c)  $7$

(d)  $-2i$



3. Evaluate the following: (Remember that  $i = \sqrt{-1}$ .)

(a)  $(-7 + i) - (1 + 6i)$

(b)  $(3 - i)(5 + 2i)$

(c)  $i(4 + 3i)$

(d)  $(-2 + 4i)(8 - i)$

4. For each of the following seeds  $s$ ,

(a) Find the first 5 terms of the Mandelbrot sequence with seed  $s$  (find more, if you need to, until you can tell what's going on). (The Mandelbot sequence is just the list of results you get when you've started with a seed.)

(b) Is this Mandelbrot sequence *escaping*, *periodic*, or *attracted*?

(c) Will the point in the plane identified with the seed be a black point, or a non-black point?

(a)  $s = 2$ .

(b)  $s = -.25$

(c)  $s = -i$

(d)  $s = 1 + i$