

Name _____ Hour _____

JULIA SETS

How is a Julia set graphed?

Let $F(x) = x^2 + c$, where $c = a + bi$ is a complex number such that $|c| \leq 2$. Pick an initial value for $c = a + bi$. Note: $|c| = \sqrt{a^2 + b^2}$

1. Select the upper and lower limits for "x" and "F(x)" (the grid size) so that $|x|, |F(x)| \leq 2$.
2. Treat each grid point as an initial orbit value. Call it x_0 .
3. At every x_0 in the grid, check whether the orbit of x_0 (in the function $F(x) = x^2 + c$) escapes within the first 20 iterations.
 - a. If the orbit of x_0 does not escape, turn the pixel on at x_0 .
 - b. If the orbit of x_0 does escape, leave the pixel turned off at x_0 .
4. If the grid has center of (0, 0), the Julia set is symmetric about the origin. Thus, if the pixel located at x_0 is turned on (or off), so is the pixel at $-x_0$.



A JULIA SET

$$F(x) = x^2 + c, c = -0.1 + 0.8i, |c| \leq 2$$

JULIA SETS

How is a Julia set graphed?

With the help of the "library" for Julia sets shown below, use the program **JULIA** to produce at least two different Julia sets. Make a sketch of each and give the "location" (coordinate) of the Julia set.

