

Mandelbrot Set

Exploration Questions

The Mandelbrot set is probably the most famous fractal. It gives a complete picture of how the Julia sets for all functions of the form

$$f(Z) = Z^2 + C$$

behave -- whether the Julia sets are connected or fractal dust.

1. Explore the black area of the [Mandelbrot set](#) picture by looking at the associated Julia sets for some of the points. Zoom in and check some black points close to the edges. What do you notice about these Julia sets?
2. Explore the colored area of the [Mandelbrot set](#) picture as in the previous problem. What do you notice? Can you draw a conclusion about Julia sets for black points versus colored points?
3. The border between the Black points and the colored points is the Mandelbrot set. This set is fractal in that it has self-similarity. Zoom in on the set and find some self-similar features. Record your observations. For example, look at the bulb sticking up off of the larger "body."



When you zoom in here, what do you see?

4. Look for your own personal favorite section of the Mandelbrot set.