

FRACTALS REVIEW

Format:

- Multiple choice: 20 questions
- Short Answer: 3
- Determine the fate of the orbit given an equation & seed value: 3
- Determine the period and/or fractional value of a bulb given an image of the bulb or its Julia Set.
- Label bulbs on the Mandelbrot Set with the Fibonacci sequence & the Devaney sequence.
- Identify the approximate location of a bulb on the Mandelbrot set given its fractional value.

Terminology:

Dynamical system

Mandelbrot Set

Butterfly effect

Orbit of a number

Chaos

Self-similar

Seed value

Iteration

Julia Set

Shattered Julia Set

Key Concepts:

1. List characteristics of a fractal.
2. Who discovered the first fractal and in what year?
3. Who demonstrated the existence of chaos and in what year?
4. What are the equations and seed values used to create Mandelbrot & Julia Sets?
5. What is the meaning of the colors of the Mandelbrot Set?
6. What is the meaning of each of the types of orbits? Fixed, n -cycle, Chaotic, Infinite
7. Calculate the period or fractional value of the largest bulb between two given bulbs.
8. What is the meaning of a fractal dimension?
9. How has the study of fractals influenced our study of astronomy and the universe?
10. List real world examples of chaos (dynamical systems) and explain why each example fits the definition of chaos and/or a dynamical system.
11. List real world examples of fractals and describe how the study of fractals and/or their characteristics influences this area.

Use your math matters, video answers, web site answers, and the computer investigation of fractals as references for the above information.