

Lecture 10: Quiz

Name:

Problem 1

Who wrote the article "How long is the coast of Britain?"

- a) Barnsley b) Newton c) Mandelbrot d) Sierpinski

Problem 2

What is the dimension of the Cantor middle set?

- a) $2/3$ b) $\log(2/3)$ c) $\log(2)/\log(3)$ d) $\log(3)/\log(2)$.

Problem 3

What is a fractal?

- a) A geometric fractured into several pieces.
 b) A set of fractions.
 c) A set with cardinality between the integers and reals.
 d) A set with non-integer dimension.

Problem 3

Assume we can cover a set X with n boxes of size r . The dimension is the limit:

- a) $\log(r)/\log(n)$ b) $-\log(n)/\log(r)$ c) $\log(n)/\log(r)$ d) $-\log(r)/\log(n)$

Problem 4

How are Julia sets defined?

- a) The set of c for which the orbit of $f_c(z) = z^2 + c$ starting with $z = c$ stays bounded. b) Starting points z for which iterates of $f_c(z) = z^2 + c$ stays bounded.
 c) The boundary of the starting points for which iterates of $f_c(z) = z^2 + c$ stays bounded.
 d) The set of c for which the orbit of $f_c(z) = z^2 + c$ starting with 0 stays bounded.

Problem 5

Which mathematician has first described the middle third Cantor set?

- a) Smith b) Cantor c) Weierstrass d) Mandelbrot

Problem 6



Which fractal is displayed in the picture?

- a) The Barnsley coulflower
 b) The sphere of Pythagoras
 c) The mandelbulb
 d) Sierpinski bulb

Problem 7

What is the Mandelbrot set?

- a) The set of z for which the orbit of $T(z) = z^2 + c$ diverges.
 b) The set of z for which the orbit of $T(z) = z^2 + c$ stays bounded.
 c) The set of c for which the orbit of $T(z) = z^2 + c$ starting with $z = 0$ diverges.
 d) The set of c for which the orbit of $T(z) = z^2 + c$ starting with $z = 0$ stays bounded.

Problem 8

The higher dimensional analog of the Mandelbrot set is also of the form $T(z) = z^8 + c$. What is multiplied by a factor 8? a) The Euler Angles. b) The radius c) The area. d) The volume

Problem 9

Which of the following sets are fractals?

- a) The Menger sponge.
 b) The sphere
 c) The graph of $y = x^2 + 1$.
 d) The Koch curve.
 e) The Cantor middle third set.

Problem 10

If we multiply the complex numbers $2 + i$ with $2 + 3i$, we get

- a) $1 + 8i$ b) $7 + 8i$ c) $4 - 2i$ d) $4 + 2i$.