

Mathematical Design, Spring 2024

Queens College, Math 128

Prof. Christopher Hanusa

<http://qc.edu/~chanusa/courses/128/24/>

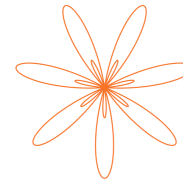
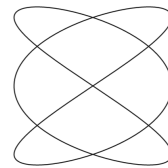
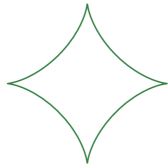
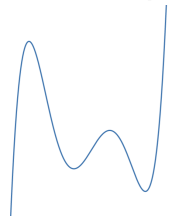
And on Microsoft Teams!

What is Mathematical Design?

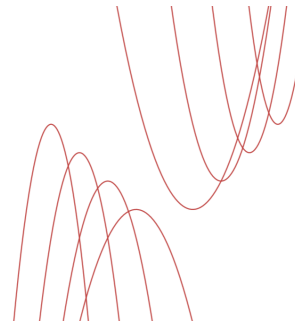
This course is a chance to be **creative** with mathematics.

- ▶ **Explore** graphs of functions.

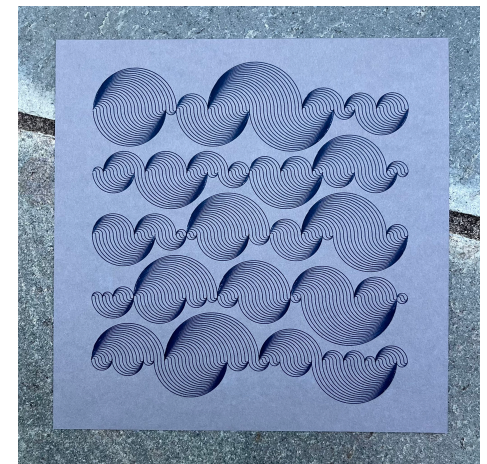
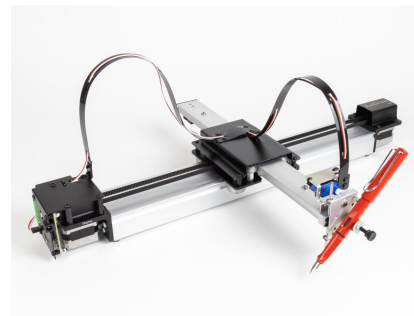
- ▶ $y = f(x)$, implicit, parametric, polar



- ▶ **Intentionally** and **artistically** place & modify functions.



- ▶ Use software and machines to **realize** your artwork.



QCmakerspace

Raphaël Gadot

Why take **Mathematical Design**?

Not already convinced?!?!

This class satisfies the Pathways MQR requirement

- ▶ Everyone has to take at least one at CUNY.
- ▶ You're getting it out of the way! (And doing it in style!)
- ▶ Does your major require calculus? (Bio? Physics?)
There is probably a better class to keep you on track.
Set up a meeting with Academic Advising.

Graded Work

Project-based learning

- ▶ Three projects that use progressively more advanced tools.
- ▶ Deliverables: • Desmos Code • Artwork • Lab Report
- ▶ Portfolio: Assemble artwork and analyze your journey.

Content Mastery

- ▶ Some “math skills”
 - ▶ Learn and Practice using Desmos Activites
 - ▶ If at first you don't succeed, try, try again.
- ▶ Some “art skills”
 - ▶ Elements of Art & Principles of Design
- ▶ Some “making skills”
 - ▶ Practice, Prototype, Productive Failure
 - ▶ Use software as a tool: Desmos, Inkscape, Illustrator, others

Class engagement

- ▶ Participate in groups in class, Ask and answer Qs in Teams.

A normal day in class

In class

- ▶ Arrive on time & Be ready to participate!
- ▶ Some initial instruction.
- ▶ Groupwork / Desmos to reinforce and challenge.
- | | | |
|---|----|--|
| Problem Solving | or | Project Work |
| ▶ More advanced problem-solving questions | | ▶ Dedicated time to make progress and ask questions on project |

Outside class

- ▶ Learning outside class
 - ▶ Homework Assignments (Practice concepts / Project Work)
 - ▶ Share work on Teams; Ask and answer questions
 - ▶ Work in the Makerspace.

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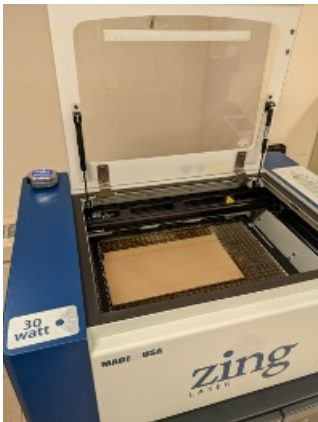
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The Queens College Makerspace

- ▶ A space with many types of machines; free for QC students
- ▶ In class next Thursday you'll go through orientation. Then you can use it whenever you want!
- ▶ You'll get an email confirmation today or tomorrow.



To do well in this class:

▶ **Form study groups.**

- ▶ Discuss tutorials and classwork.
- ▶ **Do** the homework & work on your projects.
- ▶ Bounce around ideas, topics, questions.
- ▶ It helps to have people to talk through things with.

▶ **Put in the time.**

- ▶ Three credits = 6–9 hours/week out of class.
- ▶ It takes **time** to learn the techniques.
- ▶ It takes **time** to explore the space of possibilities.
- ▶ It takes **time** to do your best work.
- ▶ You only get out what you put in.

▶ **Stay in contact.**

- ▶ If you are confused, ask questions (in class and out).
- ▶ If you are falling behind — **Reach Out!**
- ▶ If something is not quite right, share your concerns.

Everything posted online; Initial homeworks already posted.

Meet the artists

Fill out your notecard. (I'll collect it.)

- ▶ Write your name and stylize it.
- ▶ How do you help people remember your name? Share that too.

As a class:

- ▶ Introduce yourself. (your name, where you're from, your major)
- ▶ What do you like to do when you're not in school? How did you get interested in it?

Brainstorming time:

What two words come to mind when you think of "math"?

Definition of a Function

Mathematicians are very careful with the words they use.
Every word has a specific meaning.

Thought Question. What is a function?

Desmos

We will use two different parts of **Desmos**.

Desmos Classroom

Learning / Assessing

- ▶ Guided lessons
- ▶ Groupwork
- ▶ Concept Checks

Desmos Calculator

Exploration / Design

- ▶ Blank Slate
- ▶ User Driven
- ▶ Save, Share, Export

Important: Make sure you LOG IN!

- ▶ Log in to student.desmos.com to complete assignments.
- ▶ Log in to desmos.com/calculator to SAVE your work!

Creating a Desmos Account

Create a login:

- ▶ Go to desmos.com.
- ▶ Click Log In.
- ▶ Click Sign up!
- ▶ Determine how you want to log into Desmos. Choose either:
 - ▶ A Google Account (*Do NOT choose Apple.*)
(You log into Google and they authorize access to Desmos.)
 - ▶ Any Email Address
(You log in with a password on the Desmos servers.)
- ▶ Sign in to Desmos and visit desmos.com/calculator. Your name appears at the top right when you are logged in.
- ▶ The menu icon \equiv at the top left of the page is where you find your saved work.

Getting Started with Desmos

Join our Desmos Classroom:

- ▶ Go to student.desmos.com.
- ▶ Sign into Desmos with the login you just created.
- ▶ Enter the code **UYM5F9** and click Join.
- ▶ Now you are part of our Desmos Classroom!
- ▶ You will see the start of a list of activities.
- ▶ Start the **128 Day 01 Introduction to Desmos** activity.
- ▶ It should be user friendly.
Feel free to talk to your neighbors or ask me for help!