

Calculus I, Fall 2014

Queens College, Math 141

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<http://qcpages.qc.edu/~chanusa/courses/141/14/>

What is calculus?

Calculus is the study of how things change.

In Math 141 (Differential Calculus)

1. How to find the **instantaneous** change of various functions.
2. Use derivatives to solve various kinds of problems. (**Optimization!**)
3. Important concepts: Limits, Continuity, Tangents, Sketching
4. Focus on important theorems. (IVT, MVT)

Then in Math 142 (Integral Calculus):

1. Go back! Learn methods to integrate various functions.
2. Key ideas: Areas, Volumes

Why calculus?

- ▶ A challenge to conquer!
- ▶ First taste of mathematical rigor.
- ▶ Art rather than science

A normal day in this class

Outside
class

- ▶ Preparing for class
 - ▶ Complete homework, Prepare questions, Read sections for the day.

In class

- ▶ Arrive on time & Be ready to participate!
- ▶ Homework question presentations, including discussion, recap.
- ▶ Thought exercise / polling, discussion (**Bring device**)
- ▶ Lecture portion of class
 - ▶ My philosophy: More the why than the how
 - ▶ Key concepts
 - ▶ Some examples
 - ▶ Take notes! (**Bring paper, pen(cil), colors**)
- ▶ Debrief, exit slips

Outside
class

- ▶ Learning after class
 - ▶ Review notes, Work through book details, Complete homework

Class Introductions

Arrange yourselves into groups of four or five people,
With people you **don't know**.

- ▶ Introduce yourself. (your name, where you're from, your interests)
- ▶ What brought you to this class?
- ▶ Fill out **the blank side of** your notecard:
 - ▶ Write your name. (Stylize if you wish.)
 - ▶ Write a few words related to your name.
 - ▶ *Draw* something in the remaining space.
- ▶ Discuss with your groupmates why you wrote what you wrote.
- ▶ Exchange contact information. (phone / email / other)
- ▶ **Discuss!** What is *a function*?
 - ▶ Brainstorm! How do you convey *functions* to friends?
 - ▶ Organize into themes.

Four ways to express a function

Question of the day

Let f be the function defined by $f(x) = \sin x + \cos x$
and

let g be the function defined by $g(u) = \sin u + \cos u$,
for all real numbers x and u . Then,

1. f and g are exactly the same functions
2. If x and u are different numbers, f and g are different functions
3. There is not enough information is given to determine if f and g are the same.

Go to <http://pollev.com/qcch> to answer

https://www.polleverywhere.com/multiple_choice_polls/5g60aM65raeZ1Qr

Many of these questions have been curated by others.
(Thanks to Cornell, Grand Valley State)

Types of functions

Question: What types of functions do you know?

To do well in this class:

- ▶ **Form good study groups.**
 - ▶ Discuss homework and classwork. Study for exams.
 - ▶ Bounce around ideas, topics, questions.
 - ▶ You will depend on this group.
- ▶ **Put in the time.**
 - ▶ Three credits = (at least) nine hours / week out of class.
 - ▶ Homework stresses key concepts from class; learning takes time.
- ▶ **Come to class prepared.**
 - ▶ **Review** previous day's sections, notes.
 - ▶ **Do** the homework & prepare to present.
 - ▶ **Preview** the new day's sections.
- ▶ **Stay in contact.**
 - ▶ If you are confused, ask questions (in class and out).
 - ▶ Don't fall behind in coursework or homework.
 - ▶ I need to understand your concerns.

Homeworks posted online; first one (many parts) due Tuesday.

Homework policy:

There are two types of homework in this class:

- ▶ **Daily:** Written / Presentation Homework.
 - ▶ A list of questions from the textbook to practice.
 - ▶ If a question is hard, you should practice **more** like it.
 - ▶ Presentations at beginning of the next class.
 - ▶ Write up solution in bullet-point format.
 - ▶ Present the solution to the class & answer questions.
 - ▶ Only bonus point opportunity in this class.
 - ▶ Starts Tuesday September 2! (+ Blackboard quiz)
- ▶ **Weekly:** Online Homework.
 - ▶ Using online homework called [Webwork](#).
 - ▶ Link on webpage to:
<http://192.195.176.176/webwork2/QC141/>
 - ▶ Your username: QC email username.
 - ▶ Initial password: CUNYFirst ID #
 - ▶ First assignment due Thursday September 4.
 - ▶ * Get started early! *

Exit slip: What was the most surprising thing about class today?