

# Math 112: Elementary Functions

The University of Oregon

CRN 13873

Fall 2021

**Class Meetings:** MTWF, 10–10:50, in University 301

**Instructor:** Cruz Godar

**Email:** cgodar@uoregon.edu

**Office Hours:** over Zoom — MWF 12:00–12:50, and by appointment. Link on the course website.

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## Learning Outcomes

A successful student can:

- identify — by formula, verbal description, or graph — the vertical and horizontal transformations that take a parent function to an indicated function
- identify a function as periodic from its definition

- describe characteristics of periodic functions such as period, as well as amplitude and midline where applicable
- describe the sine, cosine, and tangent functions from both unit circle and right triangle perspectives
- describe the characteristics of the sine, cosine, and tangent as functions
- calculate all angles and side lengths of both right and oblique triangles, given appropriate information
- compute using both degrees and radians as measures of angles
- use identities relating to the period of sine, cosine, tangent as well as identities relating to negative angles and the Pythagorean Identity
- construct functional models from trigonometric, exponential, polynomial and rational expressions
- describe vectors in a mathematical and physical science context
- add, subtract, and perform scalar multiplication on vectors
- find and interpret the dot product of two vectors as a measure of agreement between vectors

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## Materials

**Zoom:** for office hours. It's [free to download](#) on just about every operating system there is.

**Textbook:** *Functions, Trigonometry, and their Applications*, version 2.0, by Daniel Raies

**Calculator:** A scientific calculator will save you time doing simple computations. You will only be allowed to use one of the following calculators on quizzes and exams: Casio fx-260, Casio fx-300MS (or Plus), Casio fx-300ES (or Plus), TI-30X (a, S, or IIS), TI-34. **No graphing calculators will be allowed.** The Casio fx-300MS is available from the UO Bookstore for about \$13.

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## Logistical Stuff

Class is in person. Let's keep it that way. Face coverings are required at all times in the classroom, as described in the [Provost's resource rubric](#). If anyone is not wearing a mask, I'll follow the procedure outlined there: remind the whole class about the mask requirement, then the student in question, then present that student with a mask. If that doesn't work, class will be immediately canceled for the day.

Make a friend and keep in touch. If you need to quarantine during the quarter, they'll be your first resource to keep up with class notes. If both of you need to quarantine, we'll handle that situation as necessary. If *I* need to quarantine, we'll follow the guidelines in the [Provost's resource rubric](#), which is to get a substitute for both weeks. If that doesn't work, we'll transition to Zoom until it's safe to be back in person.

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## Assignments and Grading

Your total grade in the class is determined by your attendance and participation, and your scores on the homework, quizzes, midterm exams, and the final exam, weighted in the following manner:

**Weekly Homework:** 10%

**Webwork:** 10%

**Weekly Quizzes:** 10%

**Midterm Exams:** 20% each (40% total)

**Final Exam:** 30

**Homework:** The homework is split into two parts: a handful of book problems, which are graded on completeness (only on whether you attempted them), and two additional problems written by me, which are graded on correctness. These two parts are each worth half of the homework credit. Homework will be assigned every Wednesday and due **at the start of class** the following Wednesday. Every homework assignment covers the previous week's material. Working with others is strongly encouraged, but the final work you submit must be your own. Your lowest written homework score will be dropped. **No late work will be accepted unless there is a documented, excusable circumstance.** Such circumstances include sports events in which you are involved in an official capacity (competing or playing in the band, for example), or illnesses with doctor's notes. If this is the case and you are given a make-up opportunity, the late work must be submitted no more than one week after its original due date.

All homework will be submitted via Canvas. You have two options:

- Handwrite your homework as usual and scan it, via a scanner or your smartphone. A series of pictures will **not** be accepted — only a single pdf file may be submitted. To use your smartphone for this, use the built-in document scanner in iOS (accessible through the Files app by tapping the ... menu and selecting *Scan Documents*), or the Adobe Scan app for Android.
- Typeset your homework. All the course documents (like this syllabus) are written in a language called LaTeX which compiles to the clean-looking pdf file you see. Although it takes an hour or two to become comfortable with, LaTeX is used by people in nearly every STEM-related field, and learning it now will give you a major headstart. To get started, make an account at [Overleaf](#) and create a new project. You can type as usual, and to render math expressions, surround them in dollar signs — for example,  $\frac{1}{2}$  will render as  $\frac{1}{2}$ . I'm more than happy to help with any difficulties you run into here.

**Weekly Quizzes:** There will be a Webwork assignment on nearly every section of material, due about two days after we finish the section. The link is on the course website.

**Weekly Quizzes:** We'll have a quiz every week on Wednesdays (including week 1). **No late work will be accepted unless there is a documented, excusable circumstance.** Such circum-

stances include sports events in which you are involved in an official capacity (competing or playing in the band, for example), or illnesses with doctor's notes.

**Exams:** Our class will have two midterms on the Wednesdays of weeks 4 and 8, replacing the quizzes. Each midterm will cover multiple sections of material, and the final exam will cover all of the sections covered in the course. **No make-up or early exams will be offered, except in the case of a documented, excusable circumstance.** If this is the case, the exam must be taken as soon as possible, and no more than a week after it was originally given.

- Midterm 1: Wednesday, October 20
- Midterm 2: Wednesday, November 17
- Final: 10:15 AM on Wednesday, December 8

**A note on grading:** the vast majority of problems in this class are graded on a four-point scale that is curved to an eight-point one:

8: Work that shows command of the material and has only a few small mistakes, if any.

7: Work that shows a strong understanding of the relevant material, but contains enough errors that they get in the way of the demonstration of that understanding.

5: Work that shows elements of understanding, but is too clouded with mistakes to be considered on the right track.

3: Work that demonstrates a very small amount of understanding — but still some.

0: No work shown for any problem where work is required or work that demonstrates no understanding at all of the relevant material.

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## Course Schedule

This schedule is tentative, and may change slightly throughout the quarter.

Week	Material
1	1.1–1.3
2	1.4–1.6
3	2.1–2.2
4	2.3–2.4
5	2.5–2.6
6	3.1–3.2
7	3.3–3.5
8	4.1–4.3
9	4.4–4.5
10	Review

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## Other Things

**Accessibility:** For those of you who are currently registered with Accessible Education Center for a documented disability, please present your paperwork to me during the first week of the term (or earlier) so that we can design a plan for you. Those of you with a disability, or who think they might have one, but are not registered with AEC should contact them as soon as possible. It is much more likely that measures can be taken to provide adequate special accommodation if the organization is done through AEC. Please let me know if you need additional accommodations.

**Prohibited Discrimination and Harassment Reporting:** I am a student-directed employee. For information about my reporting obligations as an employee, please see [Employee Reporting Obligations](#). Students experiencing any form of prohibited discrimination or harassment, including sex or gender based violence, may seek information on [safe.uoregon.edu](#), [respect.uoregon.edu](#), [titleix.uoregon.edu](#), or [aaeo.uoregon.edu](#) or contact the non-confidential Title IX office (541-346-8136), AAEO office (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-SAFE for help. I am also a mandatory reporter of child abuse. Please find more information at [Mandatory Reporting of Child Abuse and Neglect](#).

**Conduct:** This university exists for your benefit. If you believe something is not as it should be, don't hesitate to let me know.

And as you should hold the university to a high standard, I will hold all of you to one in return. Academic dishonesty, including looking at other students' quizzes or tests or using any materials other than those allowed during a testing period, submitting others' work as your own, or altering returned work and resubmitting it, will be met with the strictest disciplinary action possible.

**A word on learning:** Math is not a subject that is learned passively. It is one thing to understand examples from lecture and another thing entirely to work through problems by yourself. Students who come to lecture expecting it to be enough on its own to pass the tests — and therefore don't put much or any effort into the homework — typically end up with very poor class grades. For your own benefit, it's crucial to stay on top of the homework, to follow along with lecture, and to seek help — from a friend, from my office hours, from the textbook, or from a tutor — when that becomes difficult. In the same vein, it's critical that if you're struggling, you reach out before large assignments, not after. I want to help however I can, but if a test has already been graded and handed back, there's usually nothing I can do.