

MATH 41: Trigonometry and Analytic Geometry
Section 7, 105 Wartik Lab
MTWF 4:40 - 5:30 PM

This syllabus is subject to change. Please check the website regularly.

Instructor: Sara Jamshidi, McAllister Bldg 419, jamshidi@math.psu.edu, (814) 863-9049

Office Hours: MWF 5:30pm - 6:30pm (*after class*), R 4:30pm - 5:30pm, or by appointment.

Website: <http://jamshidi.weebly.com/math-41.html>

Textbook: *Algebra & Trigonometry*, 2nd edition, by Kirk Trigsted, Pearson (available on My-MathLab)

MyMathLab Section ID: hair97316

Prerequisites: Math 21 or equivalent (either course or exam score).

Course Goals: Students will

- recognize, solve, and graph linear, quadratic, exponential, logarithmic, and trigonometric equations and inequalities
- identify algebraic and graphical properties of the above functions
- know trigonometric identities and apply them in simple geometric settings

Course Description: In this course, we will study geometry (from ancient Greek *geo-* “earth” and *metron* “measurement”) and trigonometry (also from ancient Greek *trigōnon* “triangle” and *metron* “measurement”). Both of these subjects were developed by many ancient civilizations (including Mesopotamia, Sumeria, ancient Egypt, ancient Greece, and later the Indian and Islamic Empires) to better understand **construction, astronomy, surveying & map making**, and various **artisan crafts**. Why do we learn such old subjects? Because they are still useful today in all these same areas and are necessary to understand calculus. Plus, if you are ever sent back in time, you’ll have something to talk about.

We will discuss a lot of topics in this class and, as a result, we will be covering the material quickly. Roughly speaking, we cover the material of both Math 22 and Math 26 in one semester. It is important that you stay on top of your work. Please see me should any obstacles arise. The topics and tentative schedule are listed below.

Introduction & Review	8/25
Chapter 1: Equations, Inequalities, and Applications	8/26 - 9/3
Chapter 3: Functions	9/5 - 9/17
Chapter 4: Polynomial and Rational Functions	9/19 - 10/1
Additional Topics	10/3 - 10/6
Chapter 5: Exponential and Logarithmic Functions and Equations ...	10/7 - 10/20
Chapter 6: An Introduction to Trigonometric Functions	10/21 - 11/3
Chapter 7: The Graphs of Trigonometric Functions	11/4 - 11/18
Chapter 8: Trigonometric Identities, Formulas, and Equations	11/19 - 12/5
Chapter 9: Applications of Trigonometry	12/8 - 12/9
Review	12/10 - 12/12

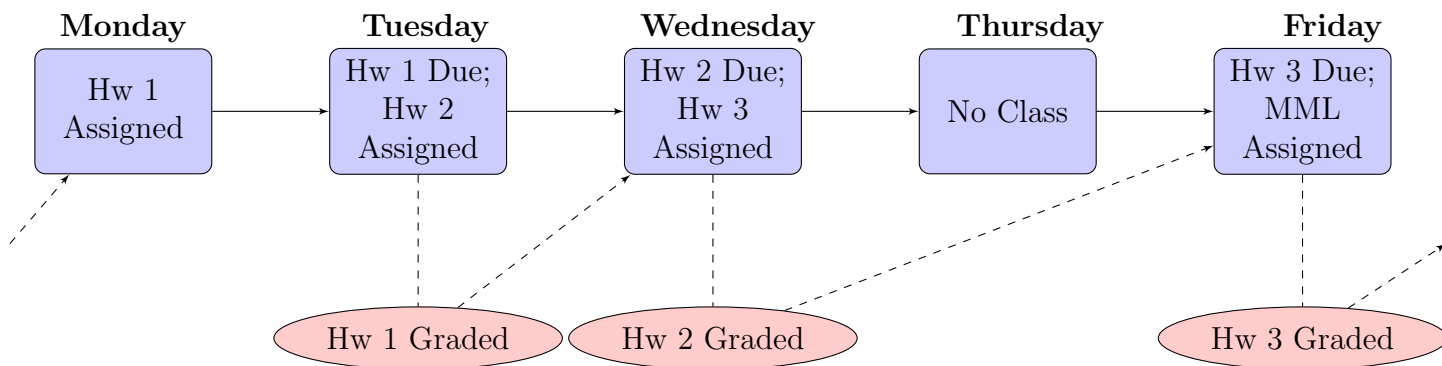
Grade Policy: Points (450 total) are distributed as follows (please see note on attendance)

100 points midterm examination I
100 pointsmidterm examination II
100 points homework/participation
150 points comprehensive final examination

Grading: Final grades will be

A	415-450 pts	B	370-394 pts	C	315-349 pts
A-	405-414 pts	B-	360-369 pts	D	270-314 pts
B+	395-404 pts	C+	350-359 pts	F	0-269 pts

Homework: You have two kinds of homework: written and online. After lectures on Monday, Tuesday, and Wednesday, you are assigned written homework that is due the following lecture. On Fridays, you are assigned online homework available through MyMathLab (Pearson). *You are responsible for submitting all homework solutions to MyMathLab by the posted due date.*



You are encouraged to start your MML assignments during the week. A special “MML Study Session” will be organized for Sunday Evenings in McAllister (details TBA later in the course).

Midterms: We will have two midterms. The first is scheduled for **Thursday, October 9** from 6:30pm to 7:45pm. The second is scheduled for **Wednesday, November 5** at the same time. Calculators will not be permitted on any exam.

Academic Integrity: Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. All University policies regarding academic integrity apply to this course.

Academic dishonesty includes, but is not limited to, cheating, plagiarizing, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. All exam answers must be your own, and you must not provide any assistance to other students during exams.

Any instances of academic dishonesty WILL be pursued under the University and Eberly College of Science regulations concerning academic integrity.

Although this statement has been directly copied from the College of Eberly Science, I want you to know that I take academic integrity very seriously. I want you to *truly* learn this material and have the pleasure of mastering it from your own merits. Your potential far exceeds this course.

Disability Services: The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications. If you have a disability-related need for adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807. For further information regarding ODS, please visit <http://equity.psu.edu/ods/>. In order to receive accommodations, you must contact ODS and provide documentation (see the documentation guidelines at <http://equity.psu.edu/ods/guidelines/documentation-guidelines>). Please share your academic adjustment letters at the beginning of the semester.

Extra Help: Do not hesitate to come to my office during office hours or make an appointment with me to discuss any aspect of the course. I also want you to visit Penn State Learning It is an excellent opportunity to talk out ideas with fellow students and a specialized tutor. I will talk more about Penn State Learning in class.

Attendance Policy: Attendance is **required** for this class. I rely on your participation in class and, as a result, your presence is crucial to the course.

It is university policy that students attend every class for which the student is scheduled. You will be held responsible for all work covered in this course. *A student whose irregular attendance causes him or her, in the judgment of the instructor, to become deficient scholastically, may run the risk of receiving a failing grade or receiving a lower grade than the student might have secured had the student been in regular attendance (Policy 42-27).*

Important Dates:

Regular Drop Deadline	September 3
Regular Add Deadline	September 4 (8:00 AM EST)
Exam Conflict Filing Period	September 29 - October 19
Midterm I	October 9 (6:30 PM)
Midterm I (Make-Up)	October 15 (6:30 PM)
Midterm II	November 5 (6:30 PM)
Midterm II (Make-Up)	November 11 (6:30 PM)
Late Drop Deadline	November 14
Thanksgiving Holiday (No Classes)	November 23 - 29
Withdrawal Deadline	December 12
Final Exams	December 16 - 20

Philosophy: Mindsets and Learning Math

Many people believe that a person is either good at math or not. Put in another way, you need a certain kind of brain to be good at math. This is an idea that one sees on television all the time; math is talked about as if it is hard, frustrating and completely unrewarding. The underlying message is that it's OK to not do well in math because it's impossibly difficult, just for 'geeks,' and some people just can't do it.

This viewpoint is called a "fixed mindset." It's a perspective that's really only prevalent in a few countries including the US and the UK. In most other countries, this is an unheard of notion. It doesn't even make sense. Scientific research has shown that human brains have the ability to change physically, functionally, and chemically *throughout your life*. This is called **brain plasticity**. There have been stunning examples of the brain's ability to create new neurons and connections. In one case, a girl completely compensated for having the right half of her brain removed within weeks and gained full motor function of her entire body.

Every time we learn, new neurons and connections between neurons form in response to that new information. Think of it as trails in a forest. The paths that are well traveled are cleared and easy to see year after year; without use, however, the forest grows back and they disappear. What we do, what we think, and how we feel all influence our brain.

An interesting study that illustrated this looked at the brains of London cab drivers. They have to learn over 300 routes, 25,000 streets, and 20,000 landmarks and points of interest for their profession. They have to pass a test called "The Knowledge." Once you've passed this, you can work anywhere in the greater London area; it takes between 2 to 4 years for most to pass this exam. Researchers studied the brains of these cab drivers and found that their hippocampus, the part of the brain responsible for memory and spacial navigation, grew to be significantly bigger and more developed than the average person. Once they retired, this part of their brain shrank back down again.

What does this tell us? All students are capable of achieving at the highest levels in math (and really anything else). This more realistic perspective is called the "growth mindset."

Interestingly, many of the world's top mathematicians echo this perspective.

There is no Nobel Prize in mathematics, but the equivalent is probably the Fields Medal. It's an award given out every 4 years to up to four people. I'd like to share with you the following quote by one awardee:

I was always deeply uncertain about my own intellectual capacity. I thought I was unintelligent. And it's true that I was, and I still am, rather slow. I need time to seize things because I always need to understand them fully. Even when I was the first to answer the teacher's questions, I knew it was because they happened to be questions to which I already knew the answer. But if a new question arose, usually students who weren't as good as I was answered before me. Towards the end of the 11th grade I secretly thought of myself as stupid I never talked about this to anyone, but I always felt convinced that my imposture would someday be revealed; the whole world and myself would see that what looked like intelligence was really just an illusion. If this ever happened, apparently no one noticed it, and I'm still just as slow... I had real trouble taking notes; it's still difficult for me to follow a seminar.

At the end of the eleventh grade I took measure of the situation and came to the conclusion that **rapidity doesn't have a precise relationship to intelligence. What is important is to deeply understand things and their relations to each other. This is where intelligence lies.** The fact of being quick or slow isn't really

relevant. Naturally, it's helpful to be quick, like it is to have a good memory. But it's neither necessary nor sufficient for intellectual success.

–Laurent Schwarz

To be successful, it helps to know that:

1. **You can master this material.** Everyone here is capable of excelling in this class; your potential far exceeds the material we will cover here.
2. **Ability is not a fixed quality.** Struggling in previous classes is not indicative of anything; your brain is capable of growing all the tools you need so long as you have the right materials at your disposal.
3. **Learn the concepts deeply.** It takes time to really learn a concept. Invest that time early in the course and the exams will be a breeze.

What's Your Mindset?

Those who have a **fixed mindset** often

- hate to fail and
- avoid challenging work at all costs.

Alternatively, those with a **growth mindset** are

- persistent,
- learn from mistakes, and
- are encouraged by the success of others.

Fixed mindsets affect students at all levels regardless of how well they typically do in a class. It's important to take a moment and recognize which mindset best describes you. Having a more growth-oriented view will mean more success in your academic career and beyond. Employers universally prefer employees who are willing to work at a problem until they can solve it; only a growth mindset is equipped to do that.