

# MATH 171-A

Spring 2016

Elementary  
Functions

(3 credits)

## Description

Study of algebraic, exponential, logarithmic, and trigonometric functions; their graphs, properties, and applications

## Materials

Textbook: *Precalculus: An Investigation of Functions* (ed. 1.5) by Lippman & Rasmussen

Buy online for ~ \$15 or download for free at: [opentextbookstore.com/precalc/](http://opentextbookstore.com/precalc/)

Graphing Calculator

Download and print activities from Blackboard or [www.bradthiessen.com](http://www.bradthiessen.com)

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## Student Learning Outcomes

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### Course outcomes

- Express functions in words, graphs, tables, and formulas
- Apply functions to model situations and solve problems
- Transform basic functions into new functions

### General Education outcome

- Students in this course develop fundamental (quantitative) skills and knowledge necessary to flourish in a rapidly changing world.

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(39 learning objectives available on website & handout)

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### Attendance policy:

In-class activities cannot be fully reproduced outside of class, so it's important that you attend class and arrive on-time. I will not deduct points from your grade for absences, but **virtually all students who have failed this class have had poor attendance.**

If you'll miss class, I'd appreciate it if you let me know in advance. You must get approval before missing exams.

### Student Success Center

Students are encouraged to go to the Student Success Center in Ambrose Hall 243 or to call 333-6331 for information regarding tutoring in this class. The SSC provides free peer tutoring for most 100 and 200 level courses, writing tutorials for papers in all classes, and study strategy advice. The center staff suggests that students seek help early, although drop in and contractual tutorials are arranged throughout the semester.

### Policy on the use of electronic equipment:

We'll use calculators and (maybe) computers in this course. Out of courtesy to other students, please turn off the volume on any devices you bring to class.

### Academic integrity policy:

While I encourage you to collaborate when studying or completing assignments, activities, homework, or projects, **you must work alone on exams!**

Review the SAU policy at <http://web.sau.edu/Registration/documents/AcademicIntegrityPolicy.pdf>

### Accommodations policy:

Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Office of Services for Students with Disabilities at 333-6275 as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

### Instructor Contact Information:

Section A: Ambrose 413-A  
MWF 8:00-8:50

Dr. Brad Thiessen  
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email: [thiessenbradleya@sau.edu](mailto:thiessenbradleya@sau.edu)  
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### Course procedures and expectations:

This course will introduce you to elementary functions you'll use to construct mathematical models and solve problems. The concepts and skills you'll learn in this class will be useful as you take future classes in statistics, the natural sciences, or Calculus.

This course consists of 39 skills across 4 major topics:

- (1) Functions, linear functions, and modeling
- (2) Exponential, logarithmic, and logistic functions
- (3) Quadratic, polynomial, and rational functions
- (4) Trigonometric functions

Each topic will be introduced through guided in-class activities. As a class, we'll work together to define terms, understand concepts, and solve problems. During these activities, I will ask lots of questions. If you attend class, actively participate, take notes, and review those notes frequently, you will master the 39 skills.

To help master those skills, I will expect you to briefly read each section of the textbook and complete practice problems (identified in this syllabus). You can download solutions to all the problems in the textbook, so I expect you'll check your own answers to evaluate your understanding. If you cannot solve a problem, let me know and we may be able to work together to solve it in class. Also, feel free to work with other students or with a peer tutor at the Student Success Center. You can also email me any questions you have.

While we'll review and use algebraic methods throughout the course, we will not emphasize symbolic manipulations. Instead, we'll focus on solving problems through a variety of graphical and analytical approaches. To check your understanding, I may ask groups of students to solve problems in front of the class. The purpose of this is not to embarrass you - I want you to gain experience solving problems and explaining your solutions.

### Assessment and Grading:

Your grade in this course will reflect the **degree to which you master all 39 course skills by the end of the semester.**

You will demonstrate mastery of the skills through frequent in-class assessments. Each assessment is designed to evaluate your mastery of 3-5 skills after they are introduced in class. From those assessments, your mastery will be rated on a 5-point scale:

- 0 = no evidence of mastery (or did not take assessment)
- 1 = I know you have not mastered this skill
- 2 = I think you have not mastered this skill
- 3 = I think you have mastered this skill
- 4 = I know you've mastered this skill, but you made some mistakes
- 5 = I know you've mastered this skill

### Do I need to buy the textbook?

To save you money, I've chosen a textbook that is available online for free. You can also choose to buy a physical copy for around \$15.

I **strongly** recommend you complete the identified exercises from the textbook. If you cannot solve any problem, go back and read the textbook section for additional help. If the book doesn't help, ask me or see a tutor at the Student Success Center.

### Do I need to do the homework and/or assignments?

I purposefully selected homework exercises to help you practice the content we will cover in class. I **strongly** recommend you work through the exercises to assess your understanding.

You will not receive points for completing textbook exercises. Likewise, you will not be directly penalized for not completing exercises.

That being said, students who complete textbook exercises almost always earn higher grades than other students. That's because the textbook exercises really do help you practice and learn the 39 skills in this course.

In recent semesters, students completing homework exercises have earned, on average, a full letter grade higher than students who did not complete homework exercises.

### What grade should I expect?

The distribution of grades from the last 5 semesters I've taught this course are:

- 20% = A
- 18% = B
- 20% = C
- 10% = D
- 18% = F / WF
- 14% = W

### Assessment and Grading (continued):

You will be given at least a few assessments over each of the 39 skills in this course, so your mastery score on each skill should improve throughout the semester. Your final score for each skill will be the **sum of your highest two scores**.

As an example, suppose you take an assessment on the first 3 skills in this course and earn scores of:

Skill 1: score = 5      Skill 2: score = 3      Skill 3: score = 1

In the following week, skills 1 and 3 happen to be assessed again. This time, you earn scores of:

Skill 1: score = 5      Skill 2: score = 4      Skill 3: score = 4

Later on in the course – during a cumulative assessment – you earn scores of:

Skill 1: score = 4      Skill 2: score = 2      Skill 3: score = 1

If those are the only assessments on these 3 skills, your final scores on each skill would be:

Skill 1: score = 10      (the two highest scores were 5 + 5)

Skill 2: score = 7      (the two highest scores were 3 + 4)

Skill 3: score = 5      (the two highest scores were 4 + 1)

While the assessments throughout the semester will focus primarily on skills we've recently learned, **any assessment at any time can assess any skill**. That's why you'll have multiple opportunities to demonstrate mastery of each skill.

At the end of the semester, I'll simply add the final scores across all 39 skills to determine your final grade. The grading scale I'll use is:

A = 351 – 390 points (at least 90% of the total number of points)

B = 312 – 350 points (between 80-90% of the total points)

C = 273 – 311 points (70-80% of the total)

D = 234 – 272 points (60-70%)

F = 0 – 233 points

You'll notice that I've scheduled at least one re-assessment day. Prior to this day, you'll be able to identify some skills you'd like to assess. Then, on the re-assessment day, you'll get a quiz over those skills and will be given the opportunity to improve your scores.

If this is confusing, don't worry. We'll discuss this standards-based grading system in depth on January 29th. You'll also have an outcomes sheet you can use to track your performance throughout the semester.

Day	Topics/Activities	Textbook assignments
1/20	Review syllabus, course objectives. Introductions.	• Get course materials
1/22	Prerequisite skills quiz.	• 1.1: 1-10, 15-34, 47-48
1/25	SLO 1-5: Introduction to Functions	
1/27	Assessment (quiz)	• 1.2: 1-18
1/29	Standards based grading system	• 1.3: 21-36
2/1	SLO 6-10: Linear Functions	• 2.1: 1-6, 17-46, 47-49
2/3	(continued)	• 2.2: 1-22, 45-50
2/5	Assessment	• 2.3: 1-12, 19-20
2/8	SLO 13-15: Fitting linear functions to data	• 2.4: 7-8, 13-14
2/10	Assessment	
2/12	SLO 11: Piecewise functions	• 1.2: 25-36
2/15	SLO 12: Transformations	• 1.5: 1-14, 17-20, 33-34, 41-56, 75-86
2/17	Assessment	
2/19	Cumulative assessment (SLOs 1-15)	
2/22	SLO 16-17: Composition of functions; inverse functions	• 1.4: 1-28, 35-40
2/24	(continued)	• 1.6: 7-10, 13-24
2/26	Assessment	
2/29	SLO 18-19: Exponential Functions	• 4.1: 7-28
3/2	(continued)	• 4.2: 1-10
3/4	Assessment	
3/7	SLO 20-23: Logarithmic Functions	• 4.3: 1-36, 41-44, 47-52, 65-70
3/9	Assessment	• 4.1: 1-6      • 4.6: 1-14      • 4.7: 13-16
3/11	Cumulative assessment (SLOs 16-23)	
3/14 – 3/18: Spring Break		
3/21	SLO 24-26: Polynomial Functions	• 3.1: 1-30
3/23	(continued)	• 3.3: 1-12, 31-50
3/25	No class – Good Friday	Choose SLOs for reassessment
3/28	No class – Easter Monday	
3/30	Assessment	
4/1	Re-assessment day	
4/4	SLO 27-30: Quadratic Functions	• 3.2: 1-30, 33-38
4/6	(continued)	
4/8	Assessment	
4/11	SLO 31-32: Rational Functions; Fitting Polynomial Functions	• 3.4: 5-24
4/13	(continued)	
4/15	Assessment	
4/18	Review SLOs 24-32	
4/20	Cumulative assessment (SLOs 24-32)	
4/22	SLO 33: Sinusoidal Functions	• 6.1: 1-24
4/25	Assessment	
4/27	SLO 34-39: Trigonometric Functions	• 5.1: 1-2      • 5.2: 3-6      • 5.3: 1-8, 19-20
4/29	(continued)	• 5.4: 9-12      • 5.4: 9-12      • 6.5: 7-18
5/2	Assessment	
5/4	Cumulative assessment (SLOs 33-39)	
5/6	Review for final exam	
Final	Cumulative assessment (SLOs 1-39)	