

MATH 118 Math for the Natural Sciences

Fall 2016 · Syllabus

Class Information

Instructor: Dr. Lauren Williams

Class Meeting: MTWF 2:00 - 2:50, Zurn 207

Office: Old Main 404 (Tower)

Office Phone: (814) 824-2226

Office Hours: Mon 9:15 - 10:45, Wed 12:15 - 1:45, Thur 12:30 - 3:00, Fri 9:15 - 10:45

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Course Description

This course has been designed for students who plan to take calculus but may be deficient in some aspects of their mathematical preparation. While many of the topics covered are similar to those covered in a typical college precalculus course, there is more emphasis on the application, a faster pace is maintained, and a greater depth of understanding is required. It is expected that students have taken intermediate algebra and precalculus prior to this class; as stated, this course is intended to fix deficiencies.

The course will cover the fundamental concepts of college algebra, precalculus, and a preparation for calculus. More specifically; the topics will include factoring, integer and rational exponents, simplifying algebraic expressions, solving equations and inequalities, basic trigonometry, function notation, polynomial and rational functions, exponential and logarithmic functions, trigonometric and inverse trigonometric functions, graphs of functions and applications.

Course Objectives

Upon successful completion of this course a student will be mathematically prepared to succeed in a college calculus course, and subsequent science courses. In particular:

- demonstrate a working knowledge of the basics of the language of mathematics,
- have acquired study habits necessary for continued success in your subsequent science and mathematics courses,
- apply your understanding of algebra as required in both calculus and applications in sciences,
- organize all of your mathematical tools, techniques, procedures, and problem solving skills further developed in this course. This will enable you to utilize the appropriate tools to restate, setup, and then solve problems in calculus and beyond,
- continue to develop your mathematical skills and thought processes subsequent to this course, given the solid foundation you built in this course.

Textbook

Precalculus Essentials, by Robert Blitzer, 4th Edition. Be sure to check the edition when purchasing your textbook; other editions have similar material, but the assigned problems may be different. No other materials are required for this class. You do NOT need to purchase a subscription to MyMathLab or pay to access any other online resources. You will not be expected to bring your textbook to class. If you prefer to purchase an electronic version of the text, you're welcome to do so.

Calculators

You are not required to purchase a calculator for this course, and **you will not be permitted to use a calculator or other electronic device on any quizzes or exams**. You are strongly encouraged to avoid using a calculator while working on homework.

Homework

When we finish a section in the book, you should immediately begin working on the homework problems from the attached list (also available on the course website). Your work will not be collected. However, actually working through these problems is the key to your success in this class. Attending every class is not enough; mathematics can only be learned through practice. You should plan to spend a significant amount of time on the homework. It is expected that you spend approximately 8-12 hours per week studying the material outside our class meetings, according to the typical 2-3 hour per credit rule of thumb.

Stay up to date with homework, and get help if you cannot understand a problem after trying it on your own. **Do not ignore a problem that you are struggling with.** Our class is focused on the foundations of mathematics that you will need in this course and in Calculus. A weak spot in this foundation will lead to a bigger problem in the future.

If you are having trouble with a topic, please come talk to me during office hours, ask questions in class, seek help from a classmate, or go to the department tutors for assistance. You are expected to try to work on all problems on your own first; when coming to my office, be prepared to show me what you've already tried.

Quizzes

You will be given quizzes on the material regularly. Keeping up with the homework will ensure that you are prepared for the quizzes, which will feature problems very similar to those in the homework. The dates for quizzes is provided in the attached schedule; note that exact topics covered on a quiz is subject to change if we are behind.

Quiz grades will not be based strictly on whether or not you found the correct answer. Your work must also be written clearly, and with proper notation, to receive full credit. Your lowest quiz grade will be dropped from your average, including any missed quizzes. Make up quizzes will only be given for excused absences. **All make ups must be completed before the graded quiz is returned to the class; this will typically be the next class meeting.**

Exams

There will be four midterm exams given throughout the semester, in addition to the final exam. The material on the exams will be similar to topics covered on quizzes and homework. You will be given review guides for each exam. All exams are cumulative; each exam will include some material from the previous exams. Mathematics is a cumulative effort, and mastering each topic is only possible if you have mastered earlier concepts. **Use of notes, textbooks, calculators, electronic devices, or other materials will not be permitted during an exam.**

If you need to miss class during a scheduled exam for a documented, excused reason (illness, family emergency, athletics), you will be able to make up the exam. You must schedule a time to retake any exam within one week of the day the exam was given in class.

Your lowest exam grade will be replaced by your final exam grade, if your final exam grade is better. A missed exam grade will be replaced by your final exam grade. A second missed exam will receive a grade of 0, so please check your schedules carefully and arrange make up exams for any excused absences.

The four midterm exams are scheduled for

- Friday, September 16
- Tuesday, October 11
- Friday, November 4
- Friday, December 2

The final exam will also be cumulative, and is scheduled for **Friday, December 16, 1:00 - 3:00 pm.**

Final Grades

Grades will be calculated as follows:

60% - Exam Average (lowest replaced by final, if better)

20% - Quizzes (lowest grade dropped)

20% - Final Exam

Quiz and exam grades will be posted on Blackboard, so you can keep track of your progress at any time. There are no opportunities for extra credit or additional points, and a curve will not be applied to the grades.

Grading scale:

F	D	D+	C	C+	B	B+	A
0-59	60-64	65-69	70-77	78-83	84-89	90-93	94-100

Tutoring

The Department of Mathematics offers free tutoring for Math 118 students in Zurn 213. No appointments are needed, just drop by between 6 and 8 pm on Sunday, Monday, Tuesday, or Thursday. You are free to ask tutors questions on any assigned homework and exam review sheets.

Support of the Mercy Mission

This course supports the mission of Mercyhurst University by creating students who are intellectually creative. Students will foster this creativity by: applying critical thinking and qualitative reasoning techniques to new disciplines; developing, analyzing, and synthesizing scientific ideas; and engaging in innovative problem solving strategies.

Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences Program secretary at 824-3017, to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

Additional (Free) Resources

- **Khan Academy Algebra II:** <https://www.khanacademy.org/math/algebra2>
Includes material on manipulating functions, polynomials, rational functions, complex numbers, and modeling.
- **Khan Academy Trigonometry:** <https://www.khanacademy.org/math/trigonometry>
Includes material on right triangle trigonometry, trig functions and graphs, and solving trig equations.
- **Wolfram Alpha:** <http://www.wolframalpha.com>
A great way to check your work. Free, with subscription available to access step-by-step solutions to problems.
- **College Algebra Textbook:** <http://stitz-zeager.com/szca07042013.pdf>
Free textbook by Carl Stitz and Jeff Zeager. Covers functions, graphing, polynomials, rational functions, modeling, exponential and logarithmic functions, and more, with practice exercises and some solutions.
- **Trigonometry Textbook:** <http://stitz-zeager.com/szct07042013.pdf>
Free textbook by Carl Stitz and Jeff Zeager. Covers functions, graphing, polynomials, rational functions, modeling, exponential and logarithmic functions, and more, with practice exercises and some solutions.
- **Precalculus Textbook:** <http://www.opentextbookstore.com/precalc/1.5/Precalc.pdf>
Free textbook by David Lippman and Melonie Rasmussen. Covers just about everything in Math 118, in the same sequence.

Math 118 Math for the Natural Sciences Homework List - Fall 2016

Sec.	Page	Problems
P.1	17	2, 6, 12, 14, 20, 22, 24, 28, 30, 32, 34, 40, 42, 54, 56, 60, 62, 64, 86, 88, 90, 94, 96, 100, 112, 114, 118, 120, 122, 159, 160
P.2	30	2, 4, 6, 8, 16, 18, 20, 22, 24, 26, 28, 34, 40, 48, 52, 54, 56, 62, 64, 108, 110, 112, 114, 136, 138, 148, 150
P.3	45	2, 4, 6, 8, 10, 12, 16, 20, 22, 26, 28, 32, 34, 38, 42, 46, 50, 56, 62, 68, 70, 72, 78, 84, 88, 90, 92, 96, 98, 112, 138
P.4	56	10, 12, 18, 22, 28, 32, 42, 44, 46, 56, 60, 70, 80, 84, 88, 90, 94, 96, 107, 108, 110
P.5	68	2, 6, 10, 12, 16, 18, 22, 26, 32, 40, 42, 46, 50, 54, 58, 60, 66, 70, 76, 78, 82, 90, 104
P.6	83	2, 4, 6, 8, 10, 16, 18, 24, 26, 28, 34, 38, 42, 46, 52, 60, 62, 64, 70, 72, 88, 96
P.7	103	2, 4, 8, 12, 16, 18, 20, 30, 36, 38, 44, 46, 48, 52, 54, 56, 58, 60, 62, 66, 76, 80, 116, 120, 126
P.9	131	28, 30, 32, 38, 42, 50, 54, 58, 60, 62, 68, 70, 78
1.1	150	2-12 even, 14, 18, 42, 44, 46, 52
1.2	168	28, 30, 32, 40, 42, 55-64, 78, 80, 82, 84, 94, 126
1.3	182	2, 4, 6, 8, 10, 12, 14, 18, 20, 22, 34, 38, 40, 42, 56, 58, 60, 72, 122
1.4	199	2, 4, 6, 8, 10, 12, 14, 18, 22, 26, 30, 38, 40, 42, 48, 60, 64, 68, 85, 86, 118
1.5	211	6, 8, 10, 14, 16, 22, 24, 33, 34
1.6	227	2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 28, 30, 54, 56, 58, 60, 62, 64, 86, 90, 146, 149, 150, 151, 152, 154
1.7	242	2, 4, 8, 10, 16, 18, 20, 52, 54, 56, 58, 62, 64, 66
1.8	254	2, 4, 6, 10, 12, 14, 16, 22, 28, 29-34, 54, 56, 58, 60, 62, 64
1.9	264	2, 4, 6, 20, 22, 24, 32, 34, 40, 42, 46, 54, 56, 58, 60, 62, 66
1.10	276	20, 22, 26, 28, 30, 31, 47
2.1	298	2, 6, 8, 10, 14, 16, 20, 22, 24, 28, 30, 32, 34, 38, 46, 52, 58, 60, 82
2.2	313	1-4, 10, 12, 14, 16, 18, 26, 28, 40, 42, 44, 46, 100
2.3	330	15-18, 20, 22, 24, 26, 28, 30, 32, 34, 38, 42, 44, 110, 112
2.4	343	2, 4, 8, 12, 18, 20, 28, 44
2.6	377	2, 4, 22, 24, 26, 30, 34, 38, 40, 42, 44, 58, 62, 66, 74
2.7	391	2, 4, 8, 16, 32, 42, 46, 54, 62, 104, 106
3.1	423	19-24, 26, 28, 30, 32, 36, 38, 42, 44, 62
3.2	437	2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 24, 26, 28, 47-52, 54, 56, 82, 84, 86, 88, 90, 94, 96, 98, 106
3.3	461	2, 4, 8, 12, 14, 16, 20, 26, 28, 32, 34, 38, 40, 42, 44, 48, 50, 54, 64, 66, 84, 86
4.1	505	14, 16, 18, 20, 22, 24, 26, 42-52 even, 58, 60, 62, 64, 66, 68, 70, 77-82, 126
4.2	520	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 30, 32, 34, 36, 40, 44
4.3	533	9-18, 22, 24, 26, 44, 46, 48
4.4	548	2, 4, 36, 38, 40, 42, 62, 68, 70, 72, 74, 88, 100, 102
4.5	568	2, 4, 6, 8, 14, 18, 38, 46, 48, 62, 64, 66
4.6	581	1-4
4.7	598	2, 4, 8, 14, 32, 34, 44, 48, 50, 54, 64, 68
5.1	630	2, 6, 8, 14, 18, 24, 30, 38, 52, 56
5.5	674	12, 16, 18, 26, 34, 40, 44, 50, 64, 68

Solutions are on Blackboard. Try the odd numbered problems for more practice (answers are in the back of the book).

Math 118 Math for the Natural Sciences Course Schedule - Fall 2016

Monday	Tuesday	Wednesday	Friday
		Aug 24 Class Intro	Aug 26 Section P.1
Aug 29 Section P.2	Aug 30 Section P.3	Aug 31 Section P.4	Sep 2 Section P.5 / Quiz
Sep 5 No Class: Labor Day	Sep 6 Section P.6	Sep 7 Section P.6	Sep 9 Section P.7 / Quiz
Sep 12 Section P.7	Sep 13 Section P.9	Sep 14 Review	Sep 16 Exam I
Sep 19 Section 1.1	Sep 20 Section 1.2	Sep 21 Section 1.3	Sep 23 Section 1.4 / Quiz
Sep 26 Section 1.5	Sep 27 Section 1.6	Sep 28 Section 1.6	Sep 30 Section 1.7 / Quiz
Oct 3 Section 1.8	Oct 4 Section 1.9	Oct 5 Section 1.10	Oct 7 Section 1.10 / Quiz
Oct 10 Review	Oct 11 Exam II	Oct 12 Section 2.1	Oct 14 No Class: Break
Oct 17 Section 2.2	Oct 18 Section 2.2	Oct 19 Section 2.3	Oct 21 Section 2.4 / Quiz
Oct 24 Section 2.4	Oct 25 Section 2.6	Oct 26 Section 2.6	Oct 28 Section 2.7 / Quiz
Oct 31 Section 3.1	Nov 1 No Class: Advising Day	Nov 2 Review	Nov 4 Exam III
Nov 7 Section 3.2	Nov 8 Section 3.3	Nov 9 Section 3.3	Nov 11 Section 4.1 / Quiz
Nov 14 Section 4.2	Nov 15 Section 4.3	Nov 16 Section 4.4	Nov 18 Section 4.5 / Quiz
Nov 21 Section 4.6	Nov 22 Section 4.6	Nov 23 No Class: Thanksgiving	Nov 25 No Class: Thanksgiving
Nov 28 Section 4.7	Nov 29 Section 4.7	Nov 30 Review	Dec 2 Exam IV
Dec 5 Section 5.1	Dec 6 Section 5.5	Dec 7 Section 5.5 / Quiz	Dec 9 Review
Dec 12 No Class: Reading Day			Dec 16 Final Exam