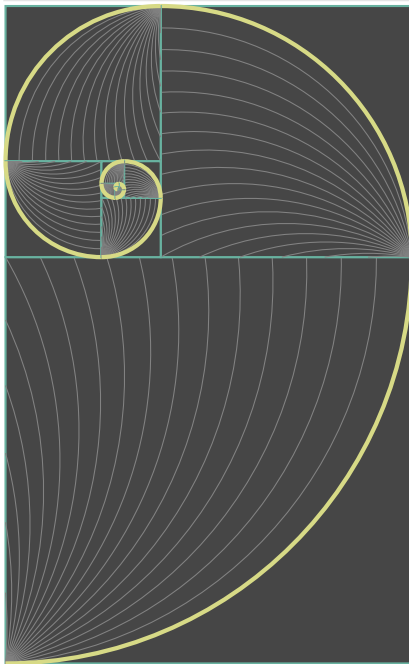# Math 118
Mathematics for the Natural Sciences
Spring 2019

Section 01
MTWF
8:00 - 8:50 am
Hirt 207

Instructor

Dr. Lauren Williams

Old Main 404

lwilliams@mercyhurst.edu

(814) 824-2226

Office Hours

Monday 3:00 - 4:00

Tuesday 12:00 - 1:30

Thursday 8:00 - 9:30

Friday 9:00 - 11:00

and by appointment

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.

The course will cover the fundamental concepts of college algebra, precalculus, and a preparation for calculus. 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 prepared to succeed in calculus and subsequent sciences courses. In particular, students will be able to:

- 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.

Course Website: http://math.mercyhurst.edu/~lwilliams/Math118/index.php

PREREQUISITES

To remain enrolled in this course, you must satisfy at least one of the following criteria:

- Began studying at Mercyhurst prior to Fall 2016

- Score of 54 or better on the ALEKS Mathematics Placement Assessment

- Passed Math 111 (College Algebra), or transfer credit for equivalent

If none of these apply, you should make arrangements to take the ALEKS Math Placement Assessment before the Add/Drop deadline on Friday, January 18th. **Students that do not meet the prerequisites by this deadline may be dropped from the course.** You will be contacted via email by the instructor reminding you to show proof of meeting prerequisites before any action is taken.

REQUIRED MATERIALS
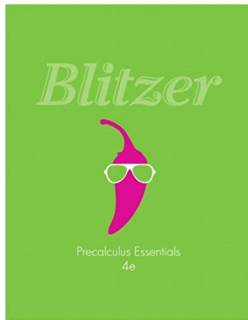
Textbook

Precalculus Essentials by Robert Blitzer, 4th Edition. No other supplies are required for the course. If you have a different edition of the textbook, it is up to you to make sure the sections and assigned problems are the same.

You will not be expected to bring your textbook to class. If you prefer to purchase or rent an electronic version of the text, you are welcome to do so.

No other materials are required for this course.

HOMEWORK

When we finish a section in the book, you should immediately begin working on the homework problems in the attached list.

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.

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. 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.

TUTORING

The Department of Mathematics offers **free, drop in tutoring for this course**. Be sure when you go that you have your course materials (book, notebook, pencil, paper, etc). The tutors will assist on a first-come, first-served basis. Even if you don't have a question, stop by and work with your classmates.

Location: Zurn 213

Day	Mon	Tues	Thurs
Time	6-8 pm	6-8 pm	6-8 pm

Personal tutors may also be arranged, free of charge, through the Mercyhurst University Tutoring Center. Students seeking tutoring can schedule an appointment via TutorTrac, at mercyhurst.go-redrock.com.

Course Components

Quizzes

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. 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, including a missed quiz, will be dropped when calculating your final grade.

If you miss a quiz, you must make arrangements to take it before the graded quizzes are 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 should be considered to be cumulative; each exam will include some material from the previous exams. **You will not be permitted to use a calculator or other electronic device on any quizzes or exams**.

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 (including a missed exam) will be replaced by your final exam grade, if your final exam grade is better. A grade of 0 on an exam due to academic dishonesty will *not* be replaced by the final exam grade.

Final Exam

The final exam is cumulative, including material from all sections covered in class. Most questions on the final will be taken (with minor modifications) from homework, quizzes, and previous exams.

You are required to take the final exam for this course regardless of your average on earlier exams or quizzes. If you will not be able to take the final exam at its scheduled time, please make alternate arrangements as soon as possible. Final exams may be made up for excused absences only.

The final exam is scheduled for Wednesday, May 8, 8:00 - 10:00 am.

Progress

Quiz and exam grades will be posted on Blackboard throughout the semester.

GRADING

300 POINTS	**Midterm Exams** 4 exams, 75 points each Lowest replaced by final exam
100 POINTS	**Quizzes** 11 quizzes, 10 points each 0.5 point for attendance Lowest quiz grade dropped
100 POINTS	**Final Exam**
500 POINTS	**Total Possible**

GRADING SCALE

D	D+	C	C+	B	B+	A
298	**333**	**348**	**383**	**398**	**433**	**448**
60%	67%	70%	77%	80%	87%	90%

OTHER COURSE INFORMATION

- Please ask questions - in class, office hours, or tutoring - as soon as you feel stuck. Mathematics is a naturally cumulative subject. If you do not understand a particular topic, you will not understand topics that come after.

- There are other textbooks available in the library and in my office. Due to book prices, you may not want to invest in a second book, but it can be helpful to have alternate sources or see topics explained in other ways.

- I do not keep detailed lecture notes. It is highly recommended that you establish contacts among your classmates to get notes in case you miss class.

- I will attempt to answer email as quickly as possible, but please allow up to 24 hours for a response (particularly on weekends).

- Attendance is not required, but coming to class regularly will give you the best chance of earning your desired grade. You are responsible for any work material covered in your absence. Please contact me if you are absent for an extended period.

- You are neither expected nor required to purchase any materials for the course aside from the required textbook. Graphing calculators and mathematical software could be used to check your work, but should not be relied on to do the work for you.

LEARNING DIFFERENCES

Mercyhurst University is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. Students with disabilities requiring accommodations should complete and submit this form:
https://www.mercyhurst.edu/sites/default/files/uploads/%3Cem%3EEdit%20Simple%3C/em%3E%20Student%20Consumer%20Information/accommodation_general.pdf
and the required documentation to the Director of Equal Opportunity Programs (DEOP), 300 Old Main, aagnew@mercyhurst.edu. Accommodations will not be granted prior to approval by the DEOP and will not be provided retroactively. Further information is available by visiting the Learning Differences website:
http://www.mercyhurst.edu/academics/learning-differences-program

ACADEMIC HONESTY

Students are required to uphold academic integrity throughout the course. In particular, plagiarism of any sort, unauthorized collaboration on exams, quizzes and other assignments, and other incidences of academic dishonesty will be handled according to the policies set forth in the Student Handbook.

COURSE EVALUATIONS

Near the end of the semester, you will be asked to complete an online course evaluation. The evaluation will be completed in class during the last two weeks of the semester using any laptop, tablet, or mobile device. The response tool allows you to note aspects of the course that helped you learn, as well as aspects that might be modified to help future students learn more effectively. You will receive an email letting you know when the evaluation window for our class is open. Please note that these course evaluations are anonymous and instructors do not see the results until after the grades for the course are submitted.

SEMESTER SCHEDULE

Monday	Tuesday	Wednesday	Friday
Jan 14 Class Intro	**Jan 15** P.1 Algebraic Expressions and Real Numbers	**Jan 16** P.2 Exponents and Scientific Notation	**Jan 18** *Add/Drop Deadline* P.3 Radicals and Rational Exponents
Jan 21 *MLK Day*	**Jan 22** **Quiz** P.3 Radicals and Rational Exponents	**Jan 23** P.4 Polynomials	**Jan 25** P.5 Factoring Polynomials
Jan 28 P.5 Factoring Polynomials	**Jan 29** **Quiz** P.6 Rational Expressions	**Jan 30** P.6 Rational Expressions	**Feb 1** P.7 Equations
Feb 4 P.7 Equations	**Feb 5** Review / Catch Up	**Feb 6** Exam I	**Feb 8** P.9 Linear and Abs Value Inequalities
Feb 11 1.1 Graphs and Graphing Utilities	**Feb 12** **Quiz** 1.2 Basics of Functions and Graphs	**Feb 13** 1.3 More on Functions and Graphs	**Feb 15** 1.4 Linear Functions and Slope
Feb 18 1.5 More on Slope	**Feb 19** **Quiz** 1.6 Transformations of Functions	**Feb 20** 1.7 Combinations of Functions	**Feb 22** 1.8 Inverse Functions
Feb 25 1.9 Distance and Midpoint Formulas	**Feb 26** Review / Catch Up	**Feb 27** Exam II	**Mar 1** 1.10 Modeling with Functions
Mar 4 *Spring Break*	*Mar 5* *Spring Break*	*Mar 6* *Spring Break*	*Mar 8* *Spring Break*
Mar 11 2.1 Complex Numbers	**Mar 12** **Quiz** 2.2 Quadratic Functions	**Mar 13** 2.3 Polynomials and Their Graphs	**Mar 15** 2.4 Dividing Polynomials
Mar 18 2.4 Dividing Polynomials	**Mar 19** **Quiz** 2.5 Zeros of Polynomial Functions	**Mar 20** 2.6 Rational Functions and Their Graphs	**Mar 22** 2.7 Polynomial and Rational Inequalities
Mar 25 3.1 Exponential Functions	**Mar 26** **Quiz** 3.2 Logarithmic Functions	**Mar 27** 3.3 Properties of Logarithms	**Mar 29** 3.3 Properties of Logarithms
Apr 1 Review / Catch Up	*Apr 2* *Advising Day*	**Apr 3** Exam III	**Apr 5** 4.1 Angles and Radian Measure
Apr 8 4.2 Trigonometric Functions	**Apr 9** **Quiz** 4.3 Right Triangle Trigonometry	**Apr 10** 4.4 Trig Functions of Any Angle	**Apr 12** *Last day to withdraw* 4.5 Graphs of sin and cos
Apr 15 4.6 Graphs of Other Trig Functions	**Apr 16** **Quiz** 4.7 Inverse Trig Functions	**Apr 17** 4.7 Inverse Trig Functions	*Apr 19* *Easter Break*
Apr 22 *Easter Break*	**Apr 23** **Quiz** 5.1 Verifying Trig Identities	**Apr 24** 5.1 Verifying Trig Identities	**Apr 26** 5.5 Trigonometric Equations
Apr 29 **Quiz** 5.5 Trigonometric Equations	**Apr 30** Review / Catch Up	**May 1** Exam IV	**May 3** Review
May 6 *Reading Day*	*May 7*	**May 8** **Final Exam 8:00 - 10:00**	

Homework List

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

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
2.5	356	2, 4, 6, 26, 28
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