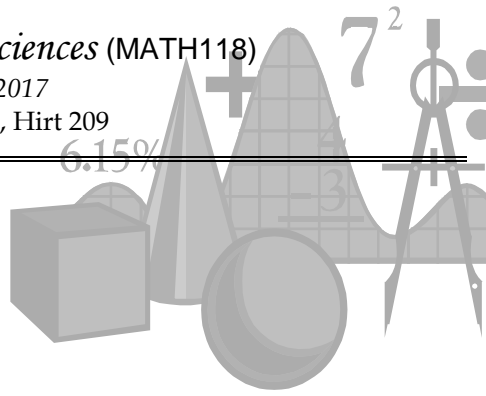


Math for the Natural Sciences (MATH118)

Spring Term 2017

M T W F 8:00-8:50, Hirt 209



Professor: Patrick M. Kelly
Office: 401 Old Main
Phone: 824-2174
E-mail: pkelly@mercyhurst.edu
Office Hours:
Mondays: 10:00-11:00
4:00-6:30
Wednesdays: 10:00-11:00
Thursdays: 8:00-9:00
Fridays: 10:00-11:00

Meeting times by appointment may be arranged as well.

Other Information:

This course is registered on *Blackboard*, an academic software package set up on Mercyhurst's internet server. You may access information about the course via *Blackboard* at any time from any computer. Please check that the e-mail address listed for you on *Blackboard* (most likely your Mercyhurst account) is the account that you use regularly. Please change it on *Blackboard* if this is not the case.

Prerequisite:

A minimum score of 54 on the ALEKS placement exam is required for this course.
(*This is currently only in effect for freshmen.*)

Text:

[Precalculus Essentials \(4th Edition\) by Robert Blitzer](#)
ISBN-13: 9780321729569 Publisher: [Pearson](#)

Calculator:

Take it under advisement that 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 so that it doesn't become a crutch for you.

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.

Student Learning Outcomes:

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, the student will:

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

Statement of Support for 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.

Grading:

Your final course grade will be compiled from several factors. Homework assignments, quizzes, four in-class exams, and the cumulative final exam will be considered for the course grade calculation. The breakdown for each component is as follows:

five hand-in homework assignments, 10 points each = 50 points
eight quizzes, 20 points each = 140 points (lowest score dropped)
four exams, 100 points each = 400 points
final exam, 160 points
total: 750 points

Course grades will be determined using the following scale:

A	702-750 points (94-100%)	B+	672-701 points (90-93%)
B	627-671 points (84-89%)	C+	582-626 points (78-83%)
C	522-581 points (70-77%)	D	447-521 points (60-69%)
F	0-446 points (below 60%)		

Homework:

Homework in a mathematics class is a must! Selected problems from each section lectured on in class will be assigned as suggested exercises. I will not be checking these problems, they are your responsibility to do and understand (I *am* available for even the most trivial of questions. . . .). Note: Anytime a particular section is covered in class—and exercises are assigned from that section—an implied homework assignment is to read that section. You will gain insight on the topic covered in class by reading the author's explanation and looking through his examples.

Five Hand-in Homework assignments will be given throughout the term as well, each worth 10 points toward your final course score.

Quizzes:

Quizzes will be used as an assessment of your understanding of the material and your progress in the course. Quizzes will be held eight times during the term, as (mostly) slated on the course schedule on the last pages of this syllabus.

Six quizzes are included in the schedule on this syllabus; the other two will be unannounced. If you are absent on the day of an unannounced quiz, you will receive a zero for that quiz—there are no make-up opportunities for these quizzes.

At the end of the semester, your lowest quiz score will be dropped.

Exams:

There are four in-class exams scheduled for the course. Be sure to note the scheduled dates as detailed on the last couple of pages of this syllabus.

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.

A Few Policies:

- You are responsible for all that is covered (including announcements) in class even if you are absent.
- If you miss a quiz or an exam, a make-up is only considered when (a) notice is given (when possible) prior to the missed assessment, (b) there is a valid reason for missing, and (c) **the make-up assessment is completed prior to the next class session**.
- Office hours are not for reteaching lessons or catching you up on something you missed.
- You are responsible for all the material in a given section unless told otherwise. Use the course schedule and suggested homework as a guide.
- A prerequisite for additional help outside the classroom is regular class attendance.

Cell Phones:

Before each class session begins, please try to remember to turn your phones off so as not to cause a disruption during class (and do realize that even the sound of a vibrating phone can be disruptive). Furthermore, cell phones are not permitted at all during exam situations (quizzes and tests).

Services:

Tutoring

Free tutoring sessions for several different mathematics courses—**Math for the Natural Sciences in particular**—are available to you. These sessions adhere to the following schedule:

Day	Time	Room
Monday	6:00-8:00	Zurn 213
Tuesday	6:00-8:00	Zurn 213
Thursday	6:00-8:00	Zurn 213

No appointment is necessary; just walk on in! Below is a link to their website:

<http://math.mercyhurst.edu/~griff/courses/Tutoring/>

You are strongly encouraged to utilize this tutoring service if you find yourself in need of some extra assistance.

Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences at 824-3017 or stop by Old Main room 314, to arrange a confidential appointment with the Disability Services Director during the first week of classes.

(Tentative) Course Schedule:

Day	Section	Material
Tuesday, 1/17		Intro to the course; assessment
Wednesday, 1/18	§P.1	Algebraic Expressions, Mathematical Models, and Real Numbers
Friday, 1/20	§P.2	Exponents and Scientific Notation
Monday, 1/23	§P.3	Radicals and Rational Exponents
Tuesday, 1/24	§P.3	Radicals and Rational Exponents
Wed., 1/25 <i>Quiz</i>	§P.4	Polynomials
Friday, 1/27	§P.5	Factoring Polynomials
Monday, 1/30	§P.6	Rational Expressions
Tuesday, 1/31	§P.6	Rational Expressions
Wed., 2/1 <i>Quiz</i>	§P.7	Equations
Friday, 2/3	§P.7	Equations
Monday, 2/6		Review/Catch-Up
Tuesday, 2/7		<i>Exam #1</i>
Wednesday, 2/8	§P.9	Linear Inequalities and Absolute Value Inequalities
Friday, 2/10	§1.1	Graphs and Graphing Utilities
Monday, 2/13	§1.2	Basics of Functions and Their Graphs
Tuesday, 2/14	§1.3	More on Functions and Their Graphs
Wed., 2/15 <i>Quiz</i>	§1.4	Linear Functions and Slope
Friday, 2/17	§1.5	More on Slope
Monday, 2/20	§1.6	Transformations of Functions
Tuesday, 2/21	§1.6	Transformations of Functions
Wednesday, 2/22	§1.7	Combinations of Functions; Composite Functions
Friday, 2/24 <i>Quiz</i>	§1.8	Inverse Functions
Monday, 2/27	§1.9	Distance and Midpoint Formulas; Circles
Tuesday, 2/28		Review/Catch-Up
Wednesday, 3/1		<i>Exam #2</i>
Friday, 3/3	§1.10	Modeling with Functions
Monday, 3/6		<i>Spring Break—no classes!</i>
Tuesday, 3/7		
Wednesday, 3/8		
Friday, 3/10		
Monday, 3/13	§1.10	Modeling with Functions
Tuesday, 3/14	§2.1	Complex Numbers
Wednesday, 3/15	§2.2	Quadratic Functions
Friday, 3/17	§2.3	Polynomial Functions and Their Graphs
Monday, 3/20 <i>Quiz</i>	§2.4	Dividing Polynomials; Remainder and Factor Theorems
Tuesday, 3/21	§2.4	Dividing Polynomials; Remainder and Factor Theorems
Wednesday, 3/22	§2.6	Rational Functions and Their Graphs
Friday, 3/24	§2.6	Rational Functions and Their Graphs

Monday, 3/27	§2.7	Polynomial and Rational Inequalities
Tuesday, 3/28	§3.1	Exponential Functions
Wednesday, 3/29		Review/Catch-Up
Friday, 3/31	<i>Exam #3</i>	
Monday, 4/3	§3.2	Logarithmic Functions
Tuesday, 4/4	§3.3	Properties of Logarithms
Wednesday, 4/5	§3.3	Properties of Logarithms
Friday, 4/7	§4.1	Angles and Radian Measure
Monday, 4/10	§4.2	Trigonometric Functions: The Unit Circle
Tuesday, 4/11	<i>Advising Day—no classes!</i>	
Wednesday, 4/12	§4.3	Right Triangle Trigonometry
Friday, 4/14	<i>Easter Break—no classes!</i>	
Monday, 4/17		
Tuesday, 4/18	§4.4	Trigonometric Functions of Any Angle
Wednesday, 4/19	§4.5	Graphs of Sine and Cosine Functions
Friday, 4/21 <i>Quiz</i>	§4.6	Graphs of Other Trigonometric Functions
Monday, 4/24	§4.6	Graphs of Other Trigonometric Functions
Tuesday, 4/25	§4.7	Inverse Trigonometric Functions
Wednesday, 4/26	§4.7	Inverse Trigonometric Functions
Friday, 4/28		Review/Catch-Up
Monday, 5/1	<i>Exam #4</i>	
Tuesday, 5/2	§5.1	Verifying Trigonometric Identities
Wednesday, 5/3	§5.5	Trigonometric Equations
Friday, 5/5	§5.5	Trigonometric Equations
Monday, 5/8	<i>Reading Day—no classes!</i>	
Wednesday, 5/10 at 8:00	<i>Final Exam</i>	