MATH 118-01 Math for the Natural Sciences
Fall 2015 · Syllabus

Class Information
Instructor: Dr. Lauren Williams
Class Meeting: MTWF 8:00 - 9:05 in Hirt 313
Office: Old Main 401 (Tower)
Office Phone: (814) 824-2226
Office Hours: Mon 10:30-12, Tues 12-1, Wed 2:15-3:15, Thurs 11-12, Fri 10:30-12
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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.

Homework

When we finish a section in the book, you should immediately begin working on the homework problems in the schedule. 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 the 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 a prepared for the quizzes, which will feature problems very similar to those in the homework. Some of these quizzes will be given in class, others will be take home quizzes. Quizzes may not always be announced: you should always be prepared for an in-class quiz.

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.

There are no make-ups for missed quizzes, except for excused absences. Talk to me if you missed a quiz. Your two lowest quiz grades will be dropped from your average, including any missed quizzes.

Exams

We will have four unit exams. Use of notes, textbooks, calculators, electronic devices, or other materials will not be permitted during an exam.

Exam Dates:
Tuesday, September 15
Friday, October 9
Wednesday, October 28
Tuesday, November 17

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.

Your lowest exam grade will be replaced by your final exam grade, if your final exam grade is better. There are no make up exams; 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 ensure that you can attend all exams. If you are an athlete, or will be missing an exam for another school function, please let me know well in advance.

The final exam will be cumulative, and is scheduled for **Wednesday, December 9 at 8:00-10:00 am**.

Final Grades

Grades will be calculated as follows:

> 60% - Average of four midterm exams
> 15% - Quizzes
> 25% - 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. **Drop in tutoring is available Sunday, Monday, Tuesday, and Thursday at 6-8 pm in Zurn 213.** You are free to ask tutors questions on any assigned homework problems.

Other Course Information

- Attendance is not required, but regular attendance is necessary to keep up with material. Let me know if you'll be missing class for an extended period.

- I will attempt to return emails as thoroughly and promptly as possible. However, it is generally better to ask complicated questions during class or in office hours. If you have a question about the homework, it is quite likely someone else has the same question, so you're doing the class a favor by asking!

- There are other textbooks available in the library, and the math department has several relevant textbooks that we lend out. 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. Please establish contacts among your classmates to get notes in case you miss class.

- Do not allow yourself to fall behind in this class. We will be covering a great deal of material in a short amount of time this semester, and it is your responsibility to stay current. Attending class, doing the homework, and seeking help when needed is the only way to succeed.

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.

Math 118 Course Schedule - Fall 2015

Date	Topic
Aug 26	Class Introduction and Assessment
Aug 28	P.1 Algebraic Expressions, Mathematical Models, and Real Numbers
Aug 31	P.2 Exponents and Scientific Notation
Sept 1	P.3 Radicals and Rational Exponents
Sept 2	P.4 Polynomials
Sept 4	P.5 Factoring Polynomials
Sept 7	*Labor Day - NO CLASS*
Sept 8	P.6 Rational Expressions
Sept 9	P.7 Equations
Sept 11	P.9 Linear Inequalities and Absolute Value Inequalities
Sept 14	Exam 1 Review
Sept 15	**EXAM I**
Sept 16	1.1 Graphs and Graphing Utilities
Sept 18	1.2 Basics of Functions and Their Graphs
Sept 21	1.3 More on Functions and Their Graphs
Sept 22	1.4 Linear Functions and Slope
Sept 23	1.5 More on Slope
Sept 25	Mid Chapter Review
Sept 28	1.6 Transformations of Functions
Sept 29	1.6 Transformations of Functions
Sept 30	1.7 Combinations of Functions; Composite Functions
Oct 2	1.8 Inverse Functions
Oct 5	1.9 Distance and Midpoint Formulas, Circles
Oct 6	1.10 Modeling with Functions
Oct 7	Exam 2 Review
Oct 9	**EXAM II**
Oct 12	2.1 Complex Numbers
Oct 13	2.2 Quadratic Functions
Oct 14	2.3 Polynomial Functions and Their Graphs
Oct 16	*Mid Semester Break - NO CLASS*
Oct 19	2.4 Dividing Polynomials; Remainder and Factor Theorems
Oct 20	Mid Chapter Review
Oct 21	2.5 Zeros of Polynomial Functions
Oct 23	2.6 Rational Functions and Their Graphs
Oct 26	2.7 Polynomial and Rational Inequalities
Oct 27	Exam 3 Review
Oct 28	**EXAM III**
Oct 30	3.1 Exponential Functions
Nov 2	3.2 Logarithmic Functions
Nov 3	3.3 Properties of Logarithms
Nov 4	Chapter 3 Review
Nov 6	4.1 Angles and Radian Measure

Nov 9	4.2 Trigonometric Functions: The Unit Circle
Nov 10	4.3 Right Triangle Trigonometry
Nov 11	4.4 Trigonometric Functions of Any Angle
Nov 13	4.5 Graphs of Sine and Cosine Functions
Nov 16	Exam 4 Review
Nov 17	**EXAM IV**
Nov 18	4.6 Graphs of Other Trigonometric Functions
Nov 20	4.7 Inverse Trigonometric Functions
Nov 23-27	*Thanksgiving Break - NO CLASS*
Nov 30	5.1 Verifying Trigonometric Identities
Dec 1	5.5 Trigonometric Equations
Dec 2	Review for Final Exam
Dec 4	Review for Final Exam
Dec 7	*Reading Day - NO CLASS*
Dec 9	**FINAL EXAM, 8-10 am**
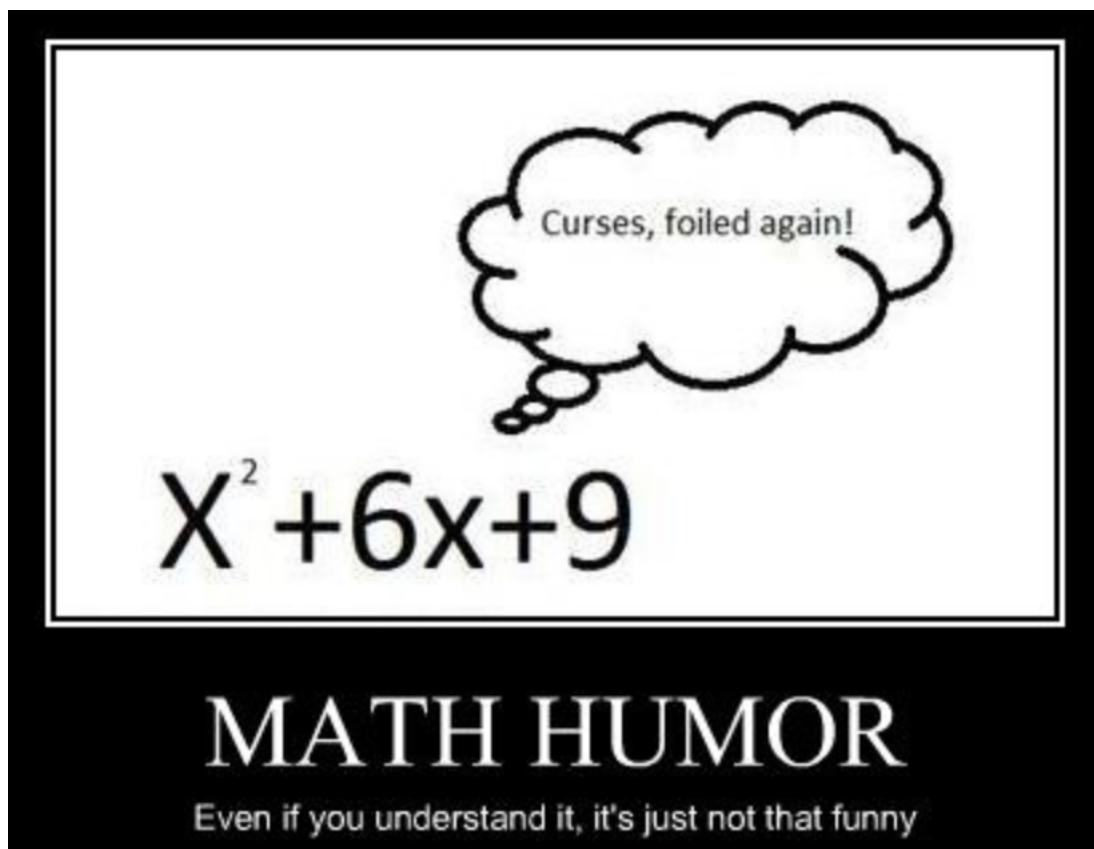
Math 118-01 Spring 2015 Homework Assignments

Note: Numbers always refer to problems in the "Exercise Set" portion, not "Concept and Vocabulary Check".

Section	Page	Problems
P.1	17	3, 9, 11, 15, 19, 21, 27, 29, 35, 53, 55, 59, 63, 69, 87, 91, 93, 99, 103, 107, 115, 117, 119, 121, 125
P.2	30	1, 3, 5, 9, 17, 21, 27, 31, 37, 41,47, 51, 61, 65, 67, 77, 83, 107, 109, 111, 113
P.3	45	1, 3, 5, 7, 11, 15, 17, 25, 29, 35, 37, 41, 45, 51, 57, 61, 66, 71, 73, 77, 81, 87, 89, 91, 97, 109, 111, 137, 139, 143
P.4	56	1, 3, 5, 7, 9, 11, 13, 15, 21, 33, 37, 47, 55, 67, 71, 79, 83, 87, 93, 95, 107, 111, 113
P.5	68	5, 9, 11, 15, 17, 21, 25, 31, 37, 41, 45, 49, 53, 57, 61, 65, 71, 77, 79, 83, 87, 93, 99, 103,109, 117, 121
P.6	83	1, 5, 9, 13, 15, 19, 25, 28, 31, 33, 35, 41, 47, 55, 59, 63, 67, 71, 73, 77, 85, 87, 106, 107, 108, 121
P.7	103	3, 9, 13, 17, 21, 25, 29, 41, 43, 47, 51, 55, 61, 75, 79, 85, 87, 91, 95, 101, 107, 117, 123, 125,129, 133, 172
P.9	131	3, 5, 13, 15, 17, 27, 35, 41, 53, 59, 65, 73, 77, 85, 93, 95, 97, 113, 119, 123
1.1	150	13, 23, 25, 27, 41, 43, 47, 49, 71, 73, 79-82
1.2	168	1, 3, 9, 11, 15, 25, 27,29, 31, 35, 37, 39, 43, 49, 65, 67, 69, 71, 73, 75, 77, 81, 83, 85, 89, 95, 131
1.3	182	1, 5, 9, 13, 17, 19, 23, 29, 33, 35, 37, 41, 43, 47, 55, 59, 61, 71
1.4	199	1, 5, 9, 11, 15, 23, 25, 31, 35, 37, 39, 43, 47, 59, 63, 67, 85, 118, 120
1.5	211	1, 3, 9, 13, 15, 21, 25, 27
1.6	227	1, 7, 9, 11, 13, 15, 17, 19, 21, 33, 43, 145, 153, 155
1.7	242	1, 5, 11, 15, 19, 21, 31, 35, 47, 51, 53, 57, 61, 65, 73, 83, 91, 93, 95
1.8	254	1, 3, 5, 9, 11, 15, 17, 25, 29-34, 37, 39, 59, 63, 69, 93, 98
1.9	264	1, 9, 15, 19, 31, 35, 41, 45, 51, 53, 59, 100
1.10	276	5, 15, 19, 21, 27, 31, 47, 68
2.1	298	3, 5, 11, 13, 17, 21, 27, 29, 33, 37, 47, 51, 55
2.2	313	1-4, 9, 13, 21, 33, 41, 45, 63, 67
2.3	330	1, 5, 7, 15-18, 19, 23, 25, 27, 31, 33, 35, 41, 47, 109
2.4	343	1, 3, 5, 7, 9, 17, 19, 27, 33, 37
2.5	356	1, 3, 5, 7, 9, 11, 13, 17, 25, 31, 33, 37
2.6	377	1, 3, 21, 25, 33, 37, 43, 57, 71, 73, 91, 93, 95
2.7	391	1, 5, 11, 15, 25, 31, 39, 41, 43, 51, 55, 59, 69, 111
3.1	423	19-24, 25, 29, 33, 35, 43, 45, 47, 49, 57, 59, 93
3.2	437	1, 3, 5, 7, 9, 11, 17, 19, 21, 25, 29, 35, 39, 41, 47-52, 53, 57, 81, 83, 89, 95, 129, 131
3.3	461	1, 5, 9, 13, 19, 23, 27, 31, 41, 43, 47, 53, 55, 71, 87, 89, 95, 101, 117
4.1	505	1, 3, 5, 13, 17, 19, 21, 25, 41, 43, 47, 51, 55, 57, 59, 63, 69, 77-82
4.2	520	1, 3, 5-18, 25, 29, 33, 37, 39, 45, 47, 71, 77, 103
4.3	533	1, 3, 7, 9, 13, 17, 19, 21, 25, 43, 45, 47, 81
4.4	548	1, 5, 9, 13, 15, 35, 47, 51, 57, 61, 65, 71, 79, 81, 87, 89, 91, 95, 99
4.5	568	1, 5, 7, 9, 13, 17, 21, 23, 29, 31, 37, 43, 47, 61, 63, 65, 67, 71
4.6	581	1-4, 5, 7, 11, 25, 27, 29, 31, 35, 43, 53, 55, 93, 95, 99
4.7	598	1, 5, 7, 9, 13, 17, 47, 51, 57, 61, 63, 67, 75, 81, 85, 89, 91
5.1	630	1, 5, 7, 9, 11, 13, 17, 21, 29, 37, 41, 43, 45, 51, 55, 59, 67, 71, 73, 78, 93, 95
5.5	674	1, 7, 9, 13, 15, 21, 25, 31, 37, 39, 41, 47, 55, 59, 63, 69, 77, 83, 117