

MATH 180: Elementary Functions

Fall 2008, 4 credits, MWF 12:10-1:00 p.m., R 11:00-11:50 a.m., MRC 448

Instructor: Richard J Maresh, Associate Professor of Mathematics

Contact information: Office MRC 521, Phone: (796) 3655, Hours: MWF 10-11, MWR 1-2

Final Exam: Friday, 12 Dec 2008, 12:50-2:50 p.m.

Course Catalog Description: Functions: graphs of functions, algebra of functions, inverse functions, polynomial and rational functions, zeros and asymptotes of functions. Exponential and logarithmic functions. Trigonometry: right-angle trigonometry, trigonometric functions, graphs of trigonometric functions, trigonometric identities, inverse trig functions. Law of Sines, Law of Cosines.

Prerequisite: Acceptable placement score, or two years of high school algebra with a B or higher average grade, or a grade of C or higher in Math 110. Recommended as general education liberal studies elective course (G9).

Text: *Precalculus: Functions and Graphs (10th Edition)*, by Swokowski and Cole. (Thompson-Brooks/Cole, 2005)

Course Goals and Objectives:

Because this course may be taken as part of the General Education requirements, the specific General Education Core Abilities are listed:

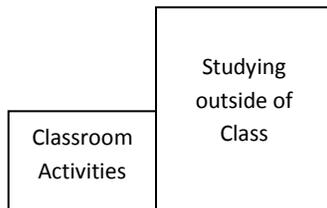
- (a) **Thinking:** Students engage in the process of inquiry and problem solving.
- Students will develop a better understanding of the concept of function.
 - Students will represent quantitative relationships arithmetically, symbolically, geometrically and graphically.
 - Students will utilize transformation of functions to obtain new functions (translation, rotation, reflection, dilation).
 - Students will understand the structure of the real numbers
 - Students will use a problem-solving approach to investigate and understand mathematical content.
 - Students will justify answers with logic and sound reasoning.
 - Students will model problems from geometry and other disciplines using function concepts.
- (b) **Ethical Decision Making:** Students respond to ethical issues, using informed value systems.
- Students will adhere to the academic honesty policy.
 - Students will understand how academic honesty in mathematics requires deductive reasoning.
 - Students will understand the need to do their own work, and to honestly challenge themselves to understand the material.
- (c) **Communication:** Students speak and write to suit varied purposes, audiences, disciplines, and contexts.
- Students will participate in class discussions on the material at hand.
 - Students will improve their ability to write solutions to a variety of problems.
- (d) **Cultural Sensitivity:** Students understand their own and other cultural traditions and demonstrate a respect for the diversity of the human experience.
- Students will develop an appreciation of the history of mathematics and its role in a variety of disciplines.
 - Students will learn to use mathematical notation accurately and appropriately.

Course Policies and Procedures

Probably the best single piece of wisdom I can pass on to you as you begin this course is: "*Mathematics is not a spectator sport!*" You need to view yourself as the LEARNER – and "learn" is an active verb, not a passive verb. I will do what I can to help structure things so that you have an appropriate sequence of topics and a useful collection of problems, but it is up to YOU to DO the problems and to READ the book and THINK ABOUT the material.

You must develop a system that works for you, but let me suggest that it might include finding a study group or coming to me with your questions or going to tutoring sessions in the learning center. In any case you should expect to spend at least the traditional expectation of 2 hours outside of class for each hour in class – this is important! Class time is for exploring the topics and answering questions you might have, but you simply can't master the material without putting in the time alone to really engage in the mathematics.

Here is a graphic to help you visualize the importance of the work you do outside of class.



Imagine that you were learning to play the piano. It's a challenge, something of a learned skill but also something of an art, and you know that if you go to those weekly lessons and then go to the next lesson without practicing *a lot* in between, you simply will not become a good piano player.

Learning calculus is very similar. You bring to the class a background of at least two years of algebra and a year of geometry, and we will build on all that material. I know the material like the back of my hand, but that's not the point. The point is that I will try to shepherd you along and will try to make the new material understandable – but you still need to practice, practice, practice!

Homework:

The text gives the answers to the odd-numbered exercises in the back of the book, and I generally assign these problems for you to practice on so that you can get that feedback right away. I will not be collecting or grading the homework exercises, but it is nonetheless imperative that you work on them. You needn't necessarily do all of the assigned problems, but you should expect to spend about 2 hours after each class working on them – anything less and you are shortchanging yourself, and are reducing your odds of success.

In addition to providing you with the necessary practice, the homework assignments will give us material to discuss in class. I expect to start each class by taking up questions raised by your trying to do the assigned exercises.

Exams and Quizzes:

There will be three exams, one at the end of chapters 2 and 3, the second covering chapters 4 and 5, and the third covering chapters 6 and 7. Each exam will be worth 100 points.

I will allow you to construct a 1-page set of notes for each unit which you can use in taking the exams. It is always a good learning aid to outline the material covered in a given unit, and this should encourage you to do so. I like to make a portion of each exam basic mechanics problems, but I also will always include a couple problems not exactly like those we have done throughout the chapter – I want to see if you can apply the concepts to new problems.

In addition to these exams there will be a handful of quizzes, as listed on the schedule below. These will be worth 10 or 15 points, and are intended to give you feedback on your progress in the course and, frankly, to encourage you to keep up with the class.

Grading:

I use a general grading scale of 90% of possible points for an "A", 80% for a "B", 70% for a "C", and 60% for a "D". I expect we will have approximately 600-650 points during the semester. Depending on how things are going I may give some sort of additional assignment, perhaps when we get into the application problems in chapter 4, for instance.

Americans with Disabilities Act (ADA):

If you have a diagnosed disability and require services or accommodations for this class, please inform me and Jane Eddy, the disabilities (ADA) coordinator (MRC 332; 796-3194) within 10 days to discuss your needs.

Math 180 Schedule, Fall 2008

Aug 25	Introduction	Ch 1 Review Exercises, p 87 #4, 8, 12, 16, ..., 72
Aug 27	[2.1] Rectangular Coordinate System	p 101 #1-37 odd
Aug 28	[2.2] Graphs of Equations	p 116 #1-51 odd, 55, 61, 65, 67, 73, 75
Aug 29	[2.3] Equations of Lines	p 132 #1-49 odd, 55, 57

Sep 1	...LABOR DAY...	
Sep 3	Quiz #1	
Sep 4	[2.4] Definition of Function	p 150 #1-57 odd, 69, 71, 75
Sep 5	[2.5] Graphs of Functions	p 169 #1-49 odd, 57, 59, 61, 69, 79

Sep 8	[2.6] Quadratic Functions	p 183 #1-41 odd, 51, 53
Sep 10	[2.7] Operations on Functions	p 196 #1-41 odd, 47, 49
Sep 11	Review...	
Sep 12	Quiz #2	

Sep 15	[3.1] Polynomial Functions of Degree > 2	p 215 #1-37 odd, 41, 45
Sep 17	[3.2] Polynomial Division	p 225 #1-37 odd, 45, 49
Sep 18	[3.3] Zeros of Polynomials	p 237 #1-43 odd, 47
Sep 19	Quiz #3	

Sep 22	[3.4] Complex and Rational Zeros	p 247 #1-35 odd
Sep 24	[3.5] Rational Functions	p 264 #1-51 odd
Sep 25	[3.6] Variation	p 272 #1-21 odd
Sep 26	Review...	

Sep 29	Practice Exam #1 (20 points)	
Oct 1	EXAM #1 (80 points)	
Oct 2	[4.1] Inverse Functions	p 288 #1-47 odd
Oct 3	[4.2] Exponential Functions	p 299 #1-41 odd, 49, 51

Oct 6	[4.3] The Natural Exponential Function	p 311 #1-25 odd
Oct 8	[4.4] Logarithmic Functions	p 325 #1-49 odd, 53, 63
Oct 9	Quiz #4	
Oct 10	[4.5] Properties of Logarithms	p 336 #1-49 odd

Oct 13	[4.6] Exponential and Logarithmic Equations	p 348 #1-45 odd, 59
Oct 15	[5.1] Angles	p 369 #1-37 odd
Oct 16	Quiz #5	
Oct 17	...Mid-Semester Break...	

Oct 20	[5.2] Trigonometric Functions of Angles	p 385 #1-25 odd, 29-63 odd, 85, 87
Oct 22	[5.3] Trigonometric Functions of Real Numbers	p 404 #1-69 odd
Oct 23	[5.4] Values of Trigonometric Functions	p 414 #1-39 odd
Oct 24	Quiz #6	

Oct 27	[5.5] Trigonometric Graphs	p 426 #1-43 odd, 51, 55
Oct 29	[5.6] Additive Trigonometric Graphs	p 437 #1-27 odd, 31, 39, 43, 47, 49, 51
Oct 30	[5.7] Applied Problems	p 446 #1-27 odd, 31, 39, 43, 47, 49, 51
Oct 31	Review...	

Nov 3	Practice Exam #2 (20 points)	
Nov 5	EXAM #2 (80 points)	
Nov 6	[6.1] Trigonometric Identities	p 466 #1-31 odd
Nov 7	[6.2] Trigonometric Equations	p 479 #1-51 odd, 63, 71

Nov 10 [6.3] Addition and Subtraction Formulas p 490 #1-45 odd, 57, 61
Nov 12 [6.4] Multiple-Angle Formulas p 500 #1-41 odd
Nov 13 [6.6] Inverse Trigonometric Functions p 521 #1-51 odd, 65, 67
Nov 14 **Quiz #7**

Nov 17 [7.1] The Law of Sines p 537 #1-23 odd
Nov 19 [7.2] The Law of Cosines p 546 #1-25 odd
Nov 20 [7.3] Vectors p 561 #1-43 odd, 61, 63
Nov 21 [7.5] Trigonometric Form for Complex Numbers p 582 #1-61 odd

Nov 24 [7.6] De Moivre's Theorem p 589 #1-27 odd
Nov 25-30 ...**THANKSGIVING BREAK**...

Dec 1 **Practice Exam #3** (20 points)
Dec 3 **EXAM #3** (80 points)
Dec 4 Review ...
Dec 5 **Practice Final Exam** (25 points)

Friday, Dec 12, 12:50-2:50 p.m. **FINAL EXAM** (125 points)