MATH 113: Trigonometry

Fall 2010, MWF 9:00-9:50 a.m., MRC 444, 3 credits
Instructor: Richard J Maresh, Associate Professor, Mathematics
Office: RCE 218, (796)-3655, Hours: MWF 10-11 and 12-1, T 12-1, or by appointment
Final Exam: Wednesday, 12/15, 7:40 – 9:40 a.m.

Course Description: This course focuses on the concepts and applications of Trigonometry. The primary goal is to prepare students for their Calculus course. Topics covered include the basics of the trigonometric functions and their graphs and applications, trigonometric identities and equations, the law of sines and law of cosines, vectors, complex numbers, conic sections, parametric equations and polar coordinates.
Pre-requisite: Appropriate placement or a grade of C or higher in MATH 111 or its equivalent.

Textbook: *Trigonometry*, by J.S. Ratti and Marcus McWaters, Addison-Wesley, 2010. ISBN 0-321-56798-6.

General Education Learner Outcomes:
(Note: The General Education structure is being modified at present, but this course, while new, was approved as a general education course in the previous system. These learner outcomes are based on that previous system.)
Thinking: Students engage in the process of inquiry and problem solving, which involves both critical and creative thinking.

- The student will demonstrate an understanding of the mechanics of Trigonometry.
- The student will be able to solve problems using trigonometric methods.

Communication: Students communicate effectively orally and in writing in an appropriate manner both personally and professionally.

- The student will communicate ideas and solutions using the language of mathematics.

Life Values: Students analyze, evaluate, and respond to ethical issues from informed personal, professional, and social value systems.

- Students understand how academic honesty in mathematics requires deductive reasoning.
- Students honestly challenge themselves to understand the material.
- Students practice academic honesty in mastering the material for the course on one's own without cheating.

Specific MATH 113 Learner Outcomes:

1. Students will learn the basic concepts of trigonometry.
2. Students will learn the various applications of trigonometry.
3. Students will improve their mathematical problem solving skills.
4. Students will improve their ability to communication mathematical ideas accurately and appropriately.

Course Policies:

First a note about the course: Trigonometry focuses on computing the measures of angles and distances; it is basically a blend of geometric and algebraic thinking. It is wonderfully useful for a variety of disciplines, such as physics and engineering as well as mathematics. MATH 113 is a pre-requisite for Physics and for Calculus here at Viterbo. In the past, trigonometry content was embedded in a four-credit course called "Elementary Functions" – it was about half of that course. So we are actually giving ourselves more time to focus on the topics of trigonometry, 3 credits rather than 2.

Homework: It takes some students a while to comprehend that the real learning occurs in doing homework problems. Attendance is important because of the presentation of ideas and the discussion of problems, but it is in the practicing that you really engage in the process of learning – you have to focus on the problems at a level of detail that you can't get by casual thinking about the concepts. Is there a secret to learning mathematics? If there is, it's right here – you have to engage! Mathematics is not a spectator sport!!

Getting Help: To be successful in this or any other mathematics course, it is important to monitor your learning. You want to make sure that you don't find out on an exam that you don't understand how to do a certain kind of problem. If you're practicing enough, you'll know way before the exam that you don't quite have a certain idea down. If this happens, make sure you do something about it! You can find a formal or informal study group, you can go to the Learning Center for tutoring, or you can come visit me with your questions. But the one thing you don't want to do is nothing! Make sure that if you do seek help, you are trying the problems so that you know what your questions are.

Exams: We will have three exams during the course, one after chapter 3, one after chapter 6, and one after chapter 8, and then a comprehensive final during final exam week, which will include the chapter 9 material. Each of these exams will be preceded by a "practice exam", which is a set of problems you can work on in groups during the class period, and you will be given the solutions immediately after the period. The purpose of this is to give you some insight into what you are expected to be able to do on the exam. These practice exams will be worth 20 points, and the individual exams will be worth 80 points, for a total of 100.
By the way, I am much more interested in understanding than in memorization, so I will allow you to create a page of notes for the exams – you want to make sure that as we work through the material you are making notes of things you think you might want to have available on the exam.
The final exam is important. I believe in a comprehensive final exam because I think it forces you to go back and review the material from the entire course; as with most math courses, this course hangs together pretty nicely, building on earlier content to reach a climax in the last few chapters. The basic thrust is to first explore the ideas and then to ask what we can do with them – in the latter chapters we are basically looking at applications of trigonometry. On occasion a student will suffer a "slow start" but eventually get up to speed; to reward such a student I typically increase a student's course grade if their final exam score is better than their semester average.

Technology: You will want to have some sort of "scientific" calculator for this course. I will generally use a TI-84 in class, but any calculator which includes the trig functions is acceptable. We then need to make sure we know how to use it! If you aren't sure how to find $\csc^{-1}(4)$, or what it means, this course is for you…

Grading: My general grading system is the following: 90% of the possible points earns an "A", 87% earns an "AB", 80% earns a "B", 77% earns a "BC", 70% earns a "C", 67% earns a "CD", and 60% earns a "D".

Attendance: I do not prefer to quantify your attendance in terms of a grade, but I can assure you that your chances of success will be much improved by regular attendance.

Blackboard: I do not use Blackboard a great deal, since we meet in person 3 times per week. However, I will try to keep a good record of what we are doing there. I'll keep a copy of the syllabus there, various study materials, and any assignments I might give. I typically use the grade center as well so that you can monitor your success rate.

Americans with Disabilities Act (ADA): If you are a person with a disability and require any auxiliary aids, services or other accommodations for this class, please see me or Jane Eddy in the Learning Center (796-3194) within 10 days to discuss your accommodation needs.

MATH 113 Schedule – Fall 2010

30 Aug	<1.1> Angles	p 9 # 1-61 odd, 67, 69, 73, 77
1 Sep	<1.2> Triangles	p 21 # 1-37 odd, 49, 53, 55, 57, 61
3 Sep	<1.3> Trigonometric Functions	p 31 # 7-47 odd, 57-69 odd
6 Sep	***-- L A B O R D A Y --***	
8 Sep	<1.4> Reference Angles	p 39 # 1-63 odd
10 Sep	<1.5> Fundamental Trig Identities	p 49 # 7-41 odd, 49-69 odd
13 Sep	<2.1> Trigonometric Functions of an Acute Angle	p 63 # 7-59 odd
15 Sep	<2.2> Solving Right Triangles	p 72 # 1-31 odd, 39-51 odd
17 Sep	<2.3> Applications of Right Triangles	p 80 # 17-37 odd
20 Sep	<3.1> Radian Measure	p 97 # 7-83 odd
22 Sep	<3.2> Applications of Radian Measure	p 103 # 7-55 odd
24 Sep	<3.3> The Unit Circle and Circular Functions	p 113 # 7-67 odd
27 Sep	<3.4> Angular and Linear Speed	p 120 # 7-51 odd
29 Sep	Practice Exam #1 (20 points)	
1 Oct	**EXAM #1** (80 points)	
4 Oct	<4.1> Graphs of Circular Functions	p 139 # 7-55 odd
6 Oct	<4.2> Amplitude and Period	p 155 # 7-65 odd, 91, 95, 97
8 Oct	<4.3> Translations of Graphs of Circular Functions	p 170 # 7-47 odd, 57-75 odd, 89, 91
11 Oct	<5.1> Verifying Identities	p 188 # 13-25 odd, 29+4n, n = 0, 1, 2, …, 10
13 Oct	<5.2> Sum and Difference Identities	p 199 # 7-45 odd, 63-69 odd
15 Oct	<5.3> Double- and Half-Angle Identities	p 210 # 7-67 odd
18 Oct	<6.1> Inverse Trigonometric Functions	p 236 # 9-69 odd
20 Oct	<6.2> Trigonometric Equations	p 245 # 7 + 4n, n = 0, 1, …, 18
22 Oct	***-- M I D – S E M E S T E R B R E A K --***	
25 Oct	<6.3> More Trigonometric Equations	p 254 # 7-53 odd, 59
27 Oct	Practice Exam #2 (20 points)	
29 Oct	**EXAM #2** (80 points)	
1 Nov	<7.1> The Law of Sines	p 269 # 7-37 odd
3 Nov	<7.2> The Law of Sines: Ambiguous Case	p 277 # 7-37 odd, 43, 45
5 Nov	<7.3> The Law of Cosines	p 283 # 7-37 odd, 41, 43
8 Nov	<7.4> The Area of a Triangle	p 290 # 7-37 odd
10 Nov	<8.1> Geometric Vectors	p 305 # 7-57 odd
12 Nov	<8.2> Algebraic Vectors	p 316 # 7-65 odd

15 Nov	<8.3> The Dot Product	p 322 # 7-57 odd
17 Nov	Practice Exam #3 (20 points)	
19 Nov	**EXAM #3** (80 points)	
22 Nov	<9.1> Polar Coordinates	p 337 # 7-57 odd
24-28 Nov	***-- THANKSGIVING BREAK --***	
29 Nov	<9.2> Polar Equations	p 348 # 7-41 odd
1 Dec	<9.3> Complex Numbers	p 357 # 7-53 odd
3 Dec	<9.4> Polar Form of Complex Numbers	p 367 # 7-63 odd
6 Dec	<9.5> Powers and Roots of Complex Numbers	p 373 # 7-57 odd
8 Dec	Review…	
10 Dec	**Practice Final Exam** (20 points)	
15 Dec	**Final Exam**, 7:40-9:40 (130 points)	