

MA 135 SYLLABUS - PRECALCULUS: COLLEGE ALGEBRA AND PLANE TRIGONOMETRY

DR. ANDREW SCHWARTZ, PH.D.

Catalog Description: MA 135-01 Algebra Trigonometry (Fall 2009)

Integrated course of College Algebra and Plane Trigonometry. Credit may not be received for MA 133 or MA 134 and MA 135. Prerequisites: MA 095 with a grade of 'C' or higher, or ACT Math subscore of 18-20 with MA 095 placement score of 14 or higher, or ACT Math subscore of 21 or higher. (5)

Text: Stewart, Redlin and Watson, (2007) *College Algebra* (2nd ed.), Belmont, CA: Thomson Brooks/Cole

Office Location and Hours: Johnson Hall 307 – T 10:00am-11:00am R 10:00am-noon and whenever I'm around (I want you to always feel free to stop by and see if I'm in. If I'm not, see if the Mathematics Learning Center can help with your question. If none of these times or situations work for you, you can make an appointment that is an appropriate time for the both of us.)

Contact Information: office phone: (573) 651-5065 e-mail: aschwartz@semo.edu
my homepage: <http://cstl-csm.semo.edu/aschwartz>

Classroom Location and Hours: JH 101 – MTWRF 9:00am-9:50am

Class Webpage: <http://cstl-csm.semo.edu/aschwartz/ma135fa09>

Course Objectives: This course is for students who will take calculus courses in the future. The primary purposes of the course are to develop problem solving capabilities requiring a logical structure and to provide the essential algebraic background for work in other fields or courses. Students will be given problems in many disciplines that use algebra in their solutions, thus giving insights into the importance of mathematical skills in almost all aspects of society. The students also learn the basic knowledge of trigonometric functions and their relationships, and the applications of trigonometry. Upon completion of the course, you should be able to (among others):

- Graph basic mathematical concepts such as points, line segments, and intervals in both one and two dimensions.
- Understand, manipulate, and graph basic quadratic functions.
- Understand, manipulate, and graph basic polynomial and rational functions.
- Understand, manipulate, and graph basic exponential and logarithmic functions.
- Understand, manipulate, and graph basic trigonometric functions.
- Understand what a conic is and how they relate to the various associated graphs.
- Understand basic sequences and how to identify them in various ways.

Expectations of Students:

- (1) Attend class
- (2) Participate in classroom activities
- (3) Provide and use a graphing calculator
- (4) Do homework
- (5) Pass quizzes and tests

Tentative Schedule:

- (1) Intro, Syllabus
- (2) 1.3 Quadratic Equations # 4, 6, 15, 21, 35, 43, 51, 61, 83, 96
- (3) 1.4 Complex Numbers # 12, 20, 21, 29, 32, 44, 53, 59, 61, 67
- (4) 2.1 The Coordinate Plane # 11, 12, 17, 21, 23, 27, 32, 38, 43, 54
- (5) 2.2 Graphs of Equations in Two Variables # 5, 7, 13, 17, 49, 51, 53, 57, 59, 67
- (6) 2.3 Graphing Calculators: Solving Equations and Inequalities Graphically # 5, 13, 21, 29, 33, 39, 47, 51, 58, 59
- (7) 2.4 Lines # 4, 12, 20, 28, 30, 34, 44, 57, 61, 66

Date: Fall 2009.

- (8) 3.1 What Is a Function? # 4, 6, 16, 24, 26, 30, 34, 38, 44, 51, E.C. 61
- (9) 3.2 Graphs of Functions # 12, 16, 24, 34, 40, 52, 54, 56, 60, 65
- (10) 3.3 Increasing and Decreasing Functions: Average Rate of Change # 2, 6, 14, 16, 20, 22, 26, 28, 30, 31
- (11) 3.4 Transformations of Functions: Vertical Shifting, Horizontal Shifting, and Reflections # 2, 4, 7, 13, 16, 24, 28, 34, 36, 46
- (12) 3.4 Transformations of Functions: Vertical Stretching and Shrinking, Horizontal Stretching and Shrinking, Even and Odd Functions # 6, 14, 18, 22, 26, 30, 41, 42, 56, 62
- (13) 3.5 Quadratic Functions: Maxima and Minima # 6, 12, 16, 20, 22, 28, 32, 42, 50, 60
- (14) 3.6 Combining Functions: Sums, Differences, Products, and Quotients # 6, 8, 12, 14, 20, 24, 28, 34, 44, 48
- (15) 3.6 Combining Functions: Composition of Functions # 6, 8, 12, 14, 20, 24, 28, 34, 44, 48
- (16) 3.7 One-to-One Functions and Their Inverses # 4, 7, 13, 18, 24, 34, 38, 52, 56, 64, E. C. 66
- (17) REVIEW over Chapters 1-3
- (18) TEST over Chapters 1-3
- (19) 4.1 Polynomial Functions and Their Graphs: Graphing Polynomials, End Behavior and the Leading Term, Using Zeros to Graph Polynomials # 2, 8, 20, 30, 40, 52, 58, 68, 72, 79
- (20) 4.1 Polynomial Functions and Their Graphs: Using Zeros to Graph Polynomials, Shape of the Graph Near a Zero, Local Maxima and Minima of Polynomials # 2, 8, 20, 30, 40, 52, 58, 68, 72, 79
- (21) 4.2 Dividing Polynomials # 4, 12, 14, 24, 46, 52, 56, 58, 62, 64
- (22) 4.3 Real Zeros of Polynomials # 4, 8, 12, 18, 28, 48, 56, 66, 76, 93
- (23) 4.4 Complex Zeros and the Fundamental Theorem of Algebra # 2, 6, 12, 16, 18, 30, 36, 38, 42, 48
- (24) 4.5 Rational Functions: Rational Functions and Asymptotes, Transformations of $y = \frac{1}{x}$, Asymptotes of Rational Functions, Slant Asymptotes and End Behavior # 2, 6, 16, 24, 26, 38, 40, 50, 58, 75
- (25) 4.5 Rational Functions: Graphing Rational Functions # 2, 6, 16, 24, 26, 38, 40, 50, 58, 75
- (26) 5.1 Exponential Functions # 4, 7, 10, 16, 20, 28, 30, 40, 46, 64, E.C. 66
- (27) 5.2 Logarithmic Functions: Logarithmic Functions, Graphs of Logarithmic Functions # 2, 8, 14, 16, 22, 26, 34, 40, 44, 56, E.C. 62, E.C. 76
- (28) 5.2 Logarithmic Functions: Common Logarithms, Natural Logarithms # 2, 8, 14, 16, 22, 26, 34, 40, 44, 56, E.C. 62, E.C. 76
- (29) 5.3 Laws of Logarithms: Laws of Logarithms, Expanding and Combining Logarithmic Expressions (only use calculator past 48) # 4, 8, 10, 16, 28, 30, 40, 42, 44, 52
- (30) 5.3 Laws of Logarithms: Expanding and Combining Logarithmic Expressions, Change of Base (only use calculator past 48) # 4, 8, 10, 16, 28, 30, 40, 42, 44, 52
- (31) 5.4 Exponential and Logarithmic Equations: Exponential Equations, Logarithmic Equations (give exact and approximate answers) # 4, 10, 24, 32, 36, 44, 48, 56, 60, 64
- (32) 5.4 Exponential and Logarithmic Equations: Logarithmic Equations, Compound Interest (give exact and approximate answers) # 4, 10, 24, 32, 36, 44, 48, 56, 60, 64
- (33) REVIEW over Chapters 4 & 5
- (34) TEST over Chapter 4 & 5
- (35) 6.1 Angle Measure # 2, 12, 14, 20, 26, 34, 42, 48, 50, 60, E.C. 72
- (36) 6.2 Trigonometry of Right Triangles # 2, 6, 8, 12, 14, 20, 24, 30, 40, 44, E.C. 60
- (37) 6.3 Trigonometric Functions of Angles: Trigonometric Functions of Angles, Evaluating Trigonometric Functions at Any Angle # 2, 8, 12, 18, 32, 34, 38, 50, 52, 58
- (38) 6.3 Trigonometric Functions of Angles: Trigonometric Identities, Area of Triangles # 2, 8, 12, 18, 32, 34, 38, 50, 52, 58
- (39) 6.4 The Law of Sines: The Law of Sines # 2, 4, 6, 8, 10, 12, 14, 18, 20, 26
- (40) 6.4 The Law of Sines: The Ambiguous Case # 2, 4, 6, 8, 10, 12, 14, 18, 20, 26
- (41) 6.5 The Law of Cosines # 2, 4, 10, 14, 20, 24, 28, 32, 40, 46
- (42) 7.1 The Unit Circle # 4, 8, 14, 16, 22, 24, 34, 36, 42, 48
- (43) 7.2 Trigonometric Functions of Real Numbers # 4, 8, 20, 28, 30, 36, 46, 54, 56, 66
- (44) 7.3 Trigonometric Graphs: Graphs of the Sine and Cosine Function # 2, 10, 18, 24, 30, 36, 42, 46, 70, 76

- (45) 7.3 Trigonometric Graphs: Graphs of Transformations of Sine and Cosine # 2, 10, 18, 24, 30, 36, 42, 46, 70, 76
- (46) 7.4 More Trigonometric Graphs: Graphs Involving Tangent and Cotangent Functions # 2, 8, 12, 14, 16, 18, 24, 32, 36, 55
- (47) 7.4 More Trigonometric Graphs: Graphs Involving the Cosecant and Secant Functions # 2, 8, 12, 14, 16, 18, 24, 32, 36, 55
- (48) REVIEW over Chapters 6 & 7
- (49) TEST over Chapter 6 & 7
- (50) 8.1 Trigonometric Identities # 2, 8, 10, 16, 18, 23, 36, 50, 60, 86
- (51) 8.2 Addition and Subtraction Formulas # 2, 4, 6, 14, 16, 24, 32, 34, 36, 42
- (52) 8.3 Double-Angle, Half-Angle, and Product-Sum Formulas # 2, 10, 18, 28, 36, 38, 46, 54, 60, 68
- (53) 8.4 Inverse Trigonometric Functions: The Inverse Sine Function, The Inverse Cosine Function # 2, 10, 14, 24, 26, 32, 34, 42, 44, 54
- (54) 8.4 Inverse Trigonometric Functions: The Inverse Tangent Function, The Inverse Secant, Cosecant and Cotangent Functions # 2, 10, 14, 24, 26, 32, 34, 42, 44, 54
- (55) 8.5 Trigonometric Equations: Solving Trigonometric Equations, Solving Trigonometric Equations by Factoring # 4, 6, 16, 18, 20, 24, 26, 32, 36, 60
- (56) 8.5 Trigonometric Equations: Equations with Trigonometric Functions of Multiple Angles, Using Inverse Trigonometric Functions to Solve Trigonometric Equations # 4, 6, 16, 18, 20, 24, 26, 32, 36, 60
- (57) 9.1 Polar Coordinates # 2, 4, 8, 10, 14, 16, 22, 24, 26, 28, E.C. 34, E.C. 36, E.C. 42, E.C. 48, 50
- (58) 9.3 Polar Form of Complex Numbers # 2, 6, 12, 14, 16, 20, 26, 34, 42, 50, E.C. 52, E.C. 54
- (59) 9.3 DeMoivre's Theorem # 2, 6, 12, 14, 16, 20, 26, 34, 42, 50, E.C. 52, E.C. 54
- (60) 9.4 Vectors: Geometric Description of Vectors, Vectors in the Coordinate Plane # 2, 8, 18, 20, 24, 28, 30, 34, 36, 44
- (61) 9.4 Vectors: Vectors in the Coordinate Plane, Using Vectors to Model Velocity and Force # 2, 8, 18, 20, 24, 28, 30, 34, 36, 44
- (62) REVIEW over Chapters 8 & 9
- (63) TEST over Chapter 8 & 9
- (64) 10.2 Systems of Linear Equations in Two Variables # 8, 14, 18, 24, 30, 32, 38, 40, 46, 50
- (65) 11.1 Parabolas # 2, 4, 8, 16, 20, 26, 30, 36, 38, 40, E.C. 50
- (66) 11.2 Ellipses # 2, 4, 8, 12, 18, 20, 26, 30, 34, 42, E.C. 50
- (67) 11.3 Hyperbolas # 2, 6, 8, 16, 18, 20, 24, 28, 32, 44
- (68) 11.4 Shifted Conics # 4, 8, 12, 14, 16, 22, 24, 26, 28, 38
- (69) 12.1 Sequences and Summation Notation # 2, 10, 16, 24, 32, 34, 36, 40, 44, 56, E.C. 62, E.C. 72
- (70) 12.6 The Binomial Theorem # 2, 4, 10, 12, 14, 16, 22, 26, 28, 32
- (71) REVIEW over Chapters 10-12
- (72) TEST over Chapters 10-12
- (73) REVIEW for Final

Grading Scale:

- A 90-100
- B 80-89.99
- C 70-79.99
- D 60-69.99
- F 0-59.99

Grading Scheme:

Homework, Participation, Quizzes 15%
 Tests 1-5 13% apiece
 Comprehensive Final 20%

Tutoring: Tutoring sessions are also available to you in the Mathematics Learning Center (this is free). The hours are 8:00am-5:30pm M-R, and 8:00am-3:00pm on Friday. The MLC is in Johnson Hall room #112. The Center for Student Involvement also provides tutoring on the second floor of the University Center through the Learning Assistance Program. Furthermore, Jamie Birkman (the Administrative Assistant in the Mathematics Department) has a list of personal (paid) tutors that are available.

Disability Support Services: "Any student who believes that they may need an academic accommodation based on the impact of a disability should contact me to arrange an appointment to discuss their

individual needs. We instructors rely on Disability Support Services to verify the need for academic accommodations and developing accommodation strategies. Students that have not already registered with Disability Support Services as a student with a disability will be encouraged to do so.”

Classroom and Final Exam Policy: The use of a scientific or graphing calculator is encouraged for use on the class and final examinations for this course; however, computers with graphic, word-processing, symbolic manipulation or programming capabilities will not be allowed for this exam (unless specifically allowed by Disability Support Services). If you cannot afford to purchase a calculator, these may be rented from Textbook Rental Services for a nominal fee. The use of books, notes, or other resource materials will not be permitted on the final examination. All cell phones prohibited during the final exam (THIS POLICY APPLIES TO THE EVERYDAY CLASSROOM AS WELL). You may NOT use the calculator on your cell phone for quizzes, tests, and the final exam. Furthermore, you are expected to be prepared for every quiz, test, or exam in this class. There will be no sharing of calculators, pencils, or erasers during any quiz, test, or the final exam. The final is at 8:00am Wednesday, December 16 in JH101 (the same room this class is in).

Absences on Exam Days: If you find that you will be unable to take an exam at the regularly scheduled time, please do your best to let me know as soon as possible, in advance of the regularly scheduled time for said exam (no exceptions), so that a make-up time can be arranged. If the absence is known ahead of time, the make-up exam needs to be taken the day or two before the rest of the class is scheduled to take the exam. If it is an emergency absence (you are hospitalized or arrested, etc.), you must take it the first or second day you are physically able to be in my office or at Testing Services.

General Student Behavior: “Every student at Southeast is obligated at all times to assume responsibility for his/her actions, to respect constituted authority, to be truthful, and to respect the rights of others, as well as to respect private and public property. In their academic activities, students are expected to maintain high standards of honesty and integrity and abide by the University’s Policy on Academic Honesty. Alleged violations of the Code of Student Conduct are adjudicated in accordance with the established procedures of the judicial system.” Dishonorable actions, such as cheating will result in an immediate zero for the correlating classroom activity. Additional unethical actions will result in a referral to the Department Chair, Dean of the College of Science and Math, and/or the University Judicial Affairs Committee.

Class Disruptions: These are absolutely not tolerated. Your classmates (their parents, legal guardians, or their scholarship sources) pay entirely too much money on tuition to have their classroom experience subjugated by rude individuals. I understand that emergencies can and do arise, however blatant refusal to cooperate, unnecessary (as deemed by myself) cell phone usage (including texting), using Ipods or mp3 players, talking in class (about non-subject related matter), frequently leaving the room (during the middle of class or walking out early) are all prohibited. If you transgress this once, it will be a verbal warning. Second offenses are cause for removal from that day’s class. Offenses past that will start to directly affect the student’s grade (1 whole percentage point off of the final grade for each and every offense including the third offense and every offense thereafter).