MAC 1147 Pre-Calculus Alg/Trig - 51264
Summer 2006

Instructor:	Fred Prescott	**Email:**	fprescott@hccfl.edu
Office:	YADM 303E	**Office Phone:**	259-6080
Office Hours:	MTWR 2:30 – 3:00 pm	(YADM 303D)	
Class Meetings:	MTWR 3:00 – 4:50 pm	(YADM 303D)	

I. Course Description

Major topics include polynomial, rational, and other algebraic functions, their properties and graphs; polynomial and rational inequalities; exponential and logarithmic functions, their properties and graphs; piecewise defined functions; trigonometric functions of real numbers; radians and angles; identities in one and two variables; applications to right triangles and oblique triangles; trigonometric equations; polar representation of complex numbers; conic sections; matrices and determinants; vectors in the plane; parametric equations; sequences and series; mathematical induction; binomial theorem; applications. NOTE: A graphing calculator is required. College level math skills required. (Previous credit for MAC 1104, MAC 1114, MAC 1135, MAC 1140, precludes credit for MAC 1147.)

Prerequisite: MAC 1105 with a "C" or better, or appropriate score on the Math Placement Exam.

II. Materials needed

1. Algebra and Trigonometry, 7th Edition by Sullivan (2005)
2. Student solution manual (optional)
3. Pencils (to be used in all tests and group activities).
4. Calculator (Texas Instruments 83, 84, or 86)
   No symbolic calculators (means no TI 92 or TI 89).
5. Graph paper. – you may download graph paper from the URL:
   www.mathematicshelpcentral.com
6. Colored pencil
7. Five Star® TI Graphing Wirebound Notebook by Mead. Available at:
   www.shoplet.com
   www.graphingcalculators.net
   www.greenlightoffice.com
   www.bizrate.com
   www.business-supply.com
   www.mead4teachers.com

III. Special Accommodations

If, to participate in this course, you require an accommodation due to a physical or learning impairment, you must contact the Office of Services to Students with Disabilities. The office is located in the Student Services Building, Room 208. You may also reach the office by phone, (813) 253-7031, TDD (813)253-7035, or (813) 253-7336.

IV. Grading

Tests
There will be 5 tests given as per the tentative lecture schedule. **There will be no make-ups or retesting.** If you provide sufficient documentation, I will allow you, at my discretion, to re-schedule a test as long as you do so before the test day. Any missed tests will result in a score of 0.

5 tests	500
Total points	**500**

Grade assignment:

A:	450 – 500 points	D:	300 – 349 points
B:	400 – 449 points	F:	0 – 299 points
C:	350 – 399 points		

V. Attendance
Regular attendance is expected. A record of attendance will be kept. The student should be aware that, in most circumstances, several absences place an increased burden on the student to successfully complete the course. If a student is absent, it is his/her responsibility/Make-ups: to obtain class notes and assignments.

VI. Academic Dishonesty
By academic dishonesty, I mean cheating or plagiarism. If I determine that a student has been academically dishonest on any assignment or test, the student will receive a zero for that work. If the student repeats the offense on another assignment or test, the student will receive an F for the course.

VII. Withdrawal
The last day to withdraw without a grade is July 10, 2006.

VIII. Tutoring
Tutoring Center is located in YLRC201. You can use any HCC tutoring centers

Help when you need it: 24 hours a day! That's

SMARTHINKING.com

Online Tutoring: Anywhere, Anytime

Math ▪ Bilingual Math ▪ Biology ▪ Chemistry ▪ Physics
Economics ▪ Accounting ▪ Statistics ▪ Spanish ▪ Writing

It's **12**am the night before your final and you're stuck on a problem. You decide it's too late to email your professor or call classmates. As you slip deeper into panic mode, you gulp your caffeinated drink and mumble under your breath, "where is help when I need it?"

Tired of situations like this one? We've got the answer to your studying needs!

With SMARTHINKING, you can

- **Connect With an e-structor** and interact with a live tutor.
- **Submit your Writing** for any class to our Online Writing Lab.
- **Submit a Question** and receive a reply from a tutor.

Follow these steps to get started:

Go to http://smarthinking.hccfl.edu

Use your HawkNet ID and password to log in.

Technology Requirements

- ***OS:*** Windows 98 +, Mac OS9 +
- ***Browser:*** *Windows: Netscape* 6 +, *Internet Explorer* 5.01 +. ***Apple Mac: Internet Explorer 5.0+ required.***
- ***Connection:*** 28.8K min. / 56K+ preferred
- ***Cookies/Javascript*** should be enabled.
- ***Popup Blockers?*** Please disable all popup blockers for www.smarthinking.com

Troubleshooting Tips:

- Make sure that your browser is set up to allow cookies and pop-up windows. SMARTHINKING uses both of these.
- Make sure that you have Java installed. If you need to install Java, go to http://www.java.com and follow the instructions for the free download.

Need help using SMARTHINKING?

E-mail Customer Support at *support@smarthinking.com or call (888) 430-7429 ext. 4*

The following is a tentative schedule for MAC 1147. Any changes will be announced in class.

Week	Date	Section
1	5/11	Intro, Review, 2.6, chapter 3
2	5/15 – 5/18	Chapter 3 and chapter 4
3	5/22 – 5/25	Chapter 5
4	5/29 – 6/1	Chapter 6
5	6/5 – 6/8	Chapter 7
6	6/12 – 6/15	Chapter 8
7	6/19 – 6/22	Chapter 9
8	6/26 – 6/29	Chapter 10
9	7/3 -7/6	Chapter 11
10	7/10 – 7/13	Chapter 12

TENTATIVE TEST DATES

Tests	Dates	Covers
Test 1	5/18 – 5/20 (Test center)	Ch. 3 & 4
Test 2	6/1 – 6/3 (Test center)	Ch. 5 & 6
Test 3	6/15 – 6/17 (Test center)	Ch. 7 & 8
Test 4	6/29 – 7/1 (Test center)	Ch. 9 &10
Test 5	7/19	Ch. 11 & 12

Test Center hours for Summer

```
MONDAY - THURSDAY     8:00 AM to 8:00 PM
FRIDAY                8:00 AM to 4:00 PM
SATURDAY              9:00 AM to 1:00 PM
```

MAC 1147: Assignment Sheet

Note: This is a tentative assignment sheet. Any changes will be announced in class.

Chapter 3: Functions and Their Graphs	Note: All problems are **odds** unless otherwise indicated.
3.1: Functions	1-5,15,23,27,31-41,47-57,61,65-69,73-81,85-91,95
3.2: Graphs of Functions	1-3,7,9-25,29,31,35,39,41
3.3: Properties of Functions	1,5,9-31
3.4: Library of Functions	1-25,29-37,41-51,55a,55b
3.5: Transformations	1-29,35,39-43,49,53,65,73
3.6: Mathematical Models	1,5,7,9,15,17,18,32; Section 3.3 #68
2.6: Linear Regression	Read section; 17, 19
Chapter 4: Polynomial & Rational Functions	
4.1: Quadratic Functions & Models	11,15,21,27,29,41,43,49,53,57,61,65,69,75-79,83-87,93
4.2: Polynomial Functions	11-23,37,41-49,53,59-61,67-69,81,85,95
4.3: Rational Functions I	13,15,19,23,27,31,41,45,49
4.4: Rational Functions II	7-11,17,21,23,25,29,33,45,49,53,55
4.5: Polynomial and Rational Inequalities	5,11,19,27,31,35,39,43,53-57
4.6: Real Zeros of a Polynomial Function	33,39,45,49,51,55,57,61,67-71,77
4.7: Complex Zeros	31-37
Chapter 5: Exponential & Log Functions	
5.1: Composite Functions	7,9,15-19,23,25,31,35,43-47,53,55,61,63,67
5.2: Inverse Functions	9-29,33,41-45,51-57,71
5.3: Exponential Functions	11,13,17,21-29,35-39,47,49,53-57,71,74,75,79,80
5.4: Logarithmic Functions	9-51,57-59,67,71,75,77,85,91-97
5.5: Properties of Log Functions	7-15,31-45,51-67; 73,75,76 (Don't use change of base)
5.6: Exponential and Log Equations	1-11,17-29,33,45,51,57
5.8: Growth and Decay	1-11,17-23; (13,15)
Chapter 6: Trig Functions	
6.1: Angles and their Measure	11-25,29-31,35,37,41,43,47-79,85-91,93,95,101
6.2: Right Triangle Trig	11,15,19,21,25-41,55bc,57abd,59abd,61a-e
6.3: Finding Values of Trig Functions	5,6; 7-51,55
6.4: Trig Functions: General Angles	11-15,21,25,29-33,39-87,89,93,97,99,101
6.5: Trig Functions: Unit Circle Approach	9,13,15,32-35,61-71
6.6: Graphs of Sine and Cosine	Part I: 9-17,21-27,31 Part II (after 6.8): 37-43,61-67,71-81,89
6.7: Other Trig Graphs	All: 7-16
6.8: Phase Shift: Sinusoidal Curves	All 3-7; Odds 15-19,21de; Addendum
Chapter 7: Analytic Trig	
7.1: Inverse Trig Functions	13-43
7.2: Inverse Trig Functions (continued)	9-35
7.3: Trig Identities	9-19,23,27,35-45,49-53,67-71,75
7.4: Sum and Difference Formulas	9-15,31-39,45,49,53,59,63
7.5: Double and Half Angle Formulas	7,9,17-23,25,35-41,47,51,57,61
7.6: Product-Sum and Sum-Product Formulas	1-21
7.7: Trig Equations I	31-39; 7-17,21,23,27-29,41-51,57,59
7.8: Trig Equations II	5,7,9,13,15,21,31,37,45,51,59,63a,65

Chapter 8: Applications of Trig Functions	
8.1: Solving Right Triangles	9,13,17-21,25,29-43,47-51
8.2: Law of Sines	9,11,21-23,29-37,41-51,55
8.3: Law of Cosines	9,13,17,23,25,31-41
8.4: Area of a Triangle	5-11,15,19,27,33,35,
Chapter 9: Polar Coordinates; Vectors	
9.1: Polar Coordinates	11-79
9.2: Polar Equations & Graphs	13-21,29-35,37,45,49,55,69
9.4: Vectors	7-43,55-63,69; Section 9.5: 25,27,31,33; Addendum
9.5: The Dot Product	7-15, 35,37
Chapter 10: Analytic Geometry	
10.1: Conics	NA
10.2: Parabolas	11-55,59,63,67,69,73
10.3: Ellipses	13-25,29-47,51-61,69-73,77
10.4: Hyperbolas	13-19,23-33,39-45,47,49,53
Chapter 11: System of Equations/Inequalities	
11.1: Linear Systems: Subst & Elimination	9,13,17,19,23,25,35,41,43
11.2: Linear Systems: Matrices	To be announced
11.3: Linear Systems: Determinants	To be announced
11.6: Non-Linear Systems	To be announced
Chapter 12: Sequences	
12.1: Sequences	To be announced
12.2: Arithmetic Sequences	To be announced
12.3: Geometric Sequences	To be announced

MAC 1147 Course Objectives

1. Show extended knowledge of objectives presented in prerequisite courses including the use of functional notations, finding function values, and evaluating derived functions and compositions.
2. Recognize and graph functions (polynomial, rational, radical, absolute value, piecewise defined, exponential, and logarithmic); determine their domain and range. Determine the intervals on which the function is increasing, decreasing, or constant. Verify using a graphing calculator.
3. Solve polynomial and rational inequalities. Express the solution as an inequality; write the solution set in interval notation; graph the solution set. Verify, using a graphing calculator.
4. Solve radical equations, identifying those solutions which are extraneous.
5. Know and use the definition of absolute value; solve absolute value equations and inequalities. Graph the solution set of inequalities. Verify using a graphing calculator.
6. Solve equations that are quadratic in form, identifying those solutions which are extraneous. Verify using a graphing calculator.
7. Apply the translation of axes rule, the stretching/shrinking rule, and the x- and y-axis reflection rules when graphing functions. Verify using a graphing calculator.
8. Determine which functions are one-to-one; find the inverse of those functions which are one-to-one; restrict the domain of those functions that are not one-to-one and find the inverse of those restricted functions. Verify using a graphing calculator.
9. Solve problems involving direct, joint, and inverse variation with and without the words direct or inverse.
10. Manipulate expressions involving rational and negative exponents. Solve exponential equations. Verify using a graphing calculator.
11. Solve word problems that lead to polynomial, rational, or exponential functions as a mathematical model. Where appropriate or necessary, use a graphing calculator.
12. Solve problems involving logarithms; change from logarithmic form to exponential form and vice versa.
13. Solve exponential and logarithmic equations using the properties of logarithmic and exponential functions.
14. Find complex zeros of polynomials of degree higher than two using theorems from the theory of equations. Verify real zeros using a graphing calculator.
15. Find solutions of systems of equations which are nonlinear that require elimination and/or substitution. Verify using a graphing calculator.
16. Find solutions of systems of at least three linear inequalities in two variables by graphing.
17. Identify arithmetic, geometric, and harmonic sequences and series; solve problems involving them. Evaluate expressions involving summations notation.
18. Perform operations of multiplication and division with complex numbers in rectangular form.
19. Know and be able to use the Binomial Theorem. Find the rth term of a binomial expansion.
20. Use the algebra of matrices. Evaluate determinants of order two or three.
21. Understand the use of Mathematical Induction in proving that statements are true or not true for positive integers.
22. Find a quadratic equation with real coefficients given an irrational or an imaginary root.
23. Solve a quadratic equation when “a”, “b”, and/or “c” are literal rather than numerical.
24. Define circle, parabola, ellipse, and hyperbola; recognize their equations, their properties, and sketch their graphs.
25. Graph conic sections using translation of axes. Verify using a graphing calculator.

26. To use a calculator to convert decimal degrees to degrees, minutes, and seconds, and vice versa.
27. To use the concepts of angle, degree, minute, second, radian, arc length, unit circle, terminal point of an arc with a given arc length, and central angle.
28. To convert radian measure to degree measure and vice versa.
29. To find arc length and angular velocity.
30. To use the Pythagorean theorem with right triangles.
31. To find the six trigonometric functions of an acute angle of a right triangle using a calculator.
32. To identify missing angles or sides of right triangles.
33. To solve applications using right triangles.
34. To find the horizontal and vertical components of a vector in a plane.
35. To find the magnitude and direction of a vector.
36. To find the resultant of a sum of vectors.
37. To solve vector applications.
38. To find a vector given its magnitude and direction.
39. To identify all six trigonometric functions of any angle using the concept of co-terminal and reference angles.
40. To apply the Law of Sines or Law of cosines to solve missing parts of an oblique triangle or an application involving an oblique triangle.
41. To find the area of an oblique triangle.
42. To know the definitions of the six trigonometric functions of a real number using the unit circle.
43. To identify the six trigonometric functions of the special angles or radians; $0°$ or 0, $30°$ or $\pi/6$, $45°$ or $\pi/4$, $60°$ or $\pi/3$, $90°$ or $\pi/2$, .
44. To use identities describing relationships among six trigonometric functions, addition formulas, double angle formulas, half-angle formulas.
45. To prove identities, and verify with a graphing calculator.
46. To solve trigonometric equations algebraically and graphically.
47. To graph the six trigonometric functions and variations of these giving period, amplitude, and phase shift. Verify using a graphing calculator.
48. To find the value of inverse trigonometric functions.
49. To identify characteristics of the inverse trigonometric functions.
50. To graph inverse trigonometric functions, specifying their domain and range. Verify with a graphing calculator.
51. To convert the trigonometric form of a complex number to rectangular form and vice versa.
52. To use DeMoivres' Theorem to find the positive integer powers of a complex number.
53. To find nth roots of a complex number.
54. To plot points in a polar coordinate system.
55. To convert polar coordinates and equations to rectangular and vice versa.
56. To graph polar curves.
57. To find dot product of vectors.
58. To recognize and graph the curve defined by a vector-valued function; determine the corresponding parametric equation of the curve.
59. To solve word problems involving simple harmonic motion and other periodic phenomena.
60. To describe a vector in three dimensions and find the cross product of two vectors in three dimensions.