

## PRE-CALCULUS COLLEGE PREP B COURSE OUTLINE

**Course Number:** 338

**Revised:** August 2009

**Level:** College Prep B

**Textbook:** Trigonometry, sixth edition  
Charles P. McKeague, Mark D. Turner, Brooks/Cole Cengage Learning,  
2008

**Length:** Full Year

**Credit:** 5 Credits

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### I. Prerequisite:

Students enrolling in this course must have attained at least a “B” average in Algebra II College Prep B or a “C” average in Algebra II College Prep A. Students who have completed Algebra II Academic with less than a “C” should also have teacher recommendation.

### II. Course Description:

This is the fourth year of our college prep mathematics sequence offered to seniors. It is designed to give students the skills they need for the study of college level pre-calculus and ultimately calculus. Students will study the theory of functions and graphs, including algebraic and polynomial functions, exponential and logarithmic functions and trigonometric functions. Students will also study applications of trigonometry, trigonometric identities and equations.

High Point Regional High School’s curriculum and instruction are aligned to the State’s Core Curriculum Content Standards and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

### III. New Jersey Core Curriculum Content Standards Addressed

4.1, 4.2, 4.3, 4.5.

#### **IV. Implementation of Technology**

Graphing Calculators will be used throughout the course to encourage discovery, problem solving and to apply mathematics to real life situations. Students are encouraged to purchase their own TI-83+ or TI-84+ graphing calculator for use in this course and for future use in college courses.

Various websites, both interactive and informational, will be infused during class and students will be encouraged to use these sites on their own time.

The Smart Board will be utilized, when appropriate, in presenting or clarifying the current math topic.

#### **V. Materials, Resources, Year Published, and Name of Text**

Trigonometry , sixth edition, Charles P. McKeague, Mark D. Turner, Brooks/Cole Cengage Learning, 2008

Supplementary Text for 1<sup>st</sup> Marking Period (Prerequisites: Fundamental Concepts of Algebra): Precalculus, Third edition, Robert Blitzer, Pearson Prentice Hall, 2007

Companion Website for textbook: [http://www.brookscole.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&flag=student&product\\_isbn\\_issn=9780495108351&disciplinenumber=1](http://www.brookscole.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&flag=student&product_isbn_issn=9780495108351&disciplinenumber=1)

Can also be found on the website: mathtv.com

#### **VI. Description of Instruction:**

Students are expected to be active participants in the learning process. The teacher will involve them in the introduction and development of material through questioning and class discussions. This process enables the teacher to assess the students' current knowledge and expand on it. When appropriate, students are guided in discovering the concepts themselves through a study of patterns and by relating the new work to their prior knowledge. The graphing calculator will be used extensively throughout the course both to help students discover concepts and to strengthen their understanding of the concepts. Students are expected to read and study material independently and apply the concepts they learn to new situations. Understanding of concepts is stressed rather than rote memorization of skills. Problem solving is emphasized throughout the course.

Homework will be given almost every day and is an important part of the course, providing students with the opportunity to apply skills learned in class, strengthen their understanding of the concepts and identify areas they don't understand. It is imperative that students do homework regularly and conscientiously. Homework will be reviewed in class and it is the student's responsibility during that time to ask questions about problems he/she doesn't understand, to identify specific mistakes and to take notes on any further explanations concerning these problems. Some of the homework will be based on the sample problems done in class and students are expected to study these

examples and use them as a guide when doing their homework. Other problems will require students to extend the concepts learned in class to new situations. Students will also be given reading assignments either to preview material that will be taught the next day or to learn new concepts and procedures independently.

Throughout various chapters in the text students will be provided with websites coordinated with the material designed to help students through interactive tutorials, study tips and practice quizzes.

## **VII. Student Evaluation:**

One to three quizzes, based on the course proficiencies, will be given during a unit and a unit test will be given at the end of each unit. An exam will be given at the end of each semester, covering all the work of that semester.

Homework will be checked regularly. It will usually not be graded for accuracy, but will be considered satisfactory if the work shown indicates the student has made a conscientious effort to complete the assignment. If a student is not able to complete the assignment because he/she doesn't understand the material, he/she may be asked to complete it after reviewing the material in class in order to receive credit for the assignment. Sometimes homework may be collected and graded as a quiz. This will occur only when the concepts have been thoroughly reviewed. Homework may also be collected and graded after it is reviewed in class. Students are expected to make corrections on homework as it is reviewed. Notebooks may also be collected and graded.

Grades will be calculated according to the school grading policy and the following guidelines:

- A. Marking Period Grade
  - 1. Quizzes and Tests 80 – 85 %  
(may also include class assignments, homework and notebooks)
  - 2. Homework 15 – 20 %
  
- B. Final Grade
  - 1. Each Marking Period 20 %
  - 2. Midterm Exam 10 %
  - 3. Final Exam 10 %

**VIII. District Policy: ACADEMIC INTEGRITY**

Pupils are expected to be honest in all of their academic work. This means that they will not engage in any of the following acts:

- Cheating on examinations or other school assignments, including but not limited to, the non-authorized use of books or notes, the use of crib sheets, copying from other students' papers, exchanging information with other students orally, in writing, or by signals, obtaining copies of the examination illegally and other similar activities. Cheating through the use of technology to exchange information on any school assignment, examination, etc. is prohibited. Technology is defined as, but not limited to, computers, telephones, text messaging, palm pilots, calculators, cameras or any other hand held device.
- Plagiarism is not permitted in term papers, themes, essays, reports, images, take-home examinations, and other academic work. Plagiarism is defined as stealing or use without acknowledgment of the ideas, words, formulas, textual materials, on-line services, computer programs, etc. of another person, or in any way presenting the work of another person as one's own.
- Falsifications, including forging signatures, altering answers after they have been graded, inserting answers after the fact, erasing of grader's markings, and other acts that allow for falsely taking credit.

A pupil found guilty of academic dishonesty may be subjected to a full range of penalties including, but not limited to reprimand and loss of credit for all of the work that is plagiarized. Disciplinary action may also be a consequence of such behavior. Additional consequences may apply as defined in specific department policies and guidelines.

A teacher who believes that a pupil has been academically dishonest in his/her class should resolve the matter in the following manner:

- Reprimand the student orally and/or in writing. The teacher is also authorized to withhold credit for the work due to academic dishonesty.
- If warranted, the teacher shall file a written complaint against the student with the Administration, requesting a more stringent form of discipline. The complaint must describe in detail the academic dishonesty that is alleged to have taken place, and must request that the matter be reviewed by the Administration.
- The Administration will determine if further discipline of the pupil is appropriate, and will determine the nature of the discipline on a case-by-case basis.
- If the pupil is not in agreement with the disciplinary action of the Administration, he/she may appeal the action first to the Principal and secondly to the Superintendent. If the pupil is dissatisfied with the Superintendent's disposition of the case, he/she may grieve the action in accordance with Policy No. 5710, Pupil Grievance.

**OBJECTIVES**

Students will be able to:

1. Evaluate algebraic expressions and use mathematical models.
2. Work with sets and find the union, intersection and complement of a set.
3. Classify real numbers and apply the properties of real numbers.
4. Solve absolute value equations/inequalities and graph absolute functions.
5. Apply basic algebra concepts, evaluate expressions, determine the domain of a function, and apply the laws of exponents.
6. Evaluate square roots and use rules of square roots to simplify and evaluate expressions.
7. Rationalize denominators containing roots.
8. Evaluate and perform operations with higher roots.
9. Perform operations with polynomials.
10. Factor polynomials.
11. Reduce, add, subtract, multiply and divide rational expressions.
12. Solve and graph linear and rational equations and inequalities.
13. Solve quadratic equations by factoring, square roots, completing the square and the quadratic formula.
14. Add, subtract, multiply, and divide complex numbers and solve quadratic equations with complex roots.
15. Graph equations by hand and using the graphing calculator.
16. Use a graphing utility to create tables and approximate the intercepts from a graph.
17. Identify types of angles and determine their complements and supplements.
18. Identify special right triangles and prove the Pythagorean Theorem.
19. Use the Pythagorean Theorem to solve for missing sides of a right triangle.

20. Graph lines and parabolas on a coordinate system by hand and with a graphing calculator.
21. Use the distance formula to derive the equation of a circle.
22. Identify angles in standard position and find co-terminal angles.
23. Identify the six trigonometric functions as ratios of  $x$ ,  $y$ , and  $r$ .
24. Find the value of the trig functions given a point on the terminal side of an angle.
25. Derive and apply the reciprocal, ratio and Pythagorean identities
26. Use identities to find the value of various trig functions.
27. Write a trigonometric function in terms of other trig functions.
28. Define the six trigonometric functions as ratios of the sides of right triangles.
29. Determine the exact values of the trig functions for special right triangles.
30. Convert between decimal degrees and degrees, minutes and seconds.
31. Use the graphing calculator to evaluate trigonometric functions.
32. Solve application problems including topography, distance, force, and bearings.
33. Use vectors to represent quantities geometrically and find their magnitude.
34. Add, subtract and perform scalar multiplication with vectors.
35. Solve problems involving velocity, distance, force, and work using vectors
36. Find exact values of trigonometric functions using co-terminal or reference angles.
37. Use the calculator to approximate the value of trigonometric functions.
38. Find the radian measure of angles and convert between radian and degrees.
39. Define and evaluate the six trigonometric functions in terms of the rotation of a ray in standard position and a point on the unit circle.
40. Determine the range, domain and period of trigonometric functions.
41. Determine arc length, angular and linear speed, and the area of a sector of a circle.
42. Apply the concepts of trigonometry to solve real world problems.

43. Graph the six trigonometric functions.
44. Use amplitude, period, horizontal and vertical translation and phase shift to transform these graphs.
45. Determine trigonometric equations from their graphs.
46. Graph inverse trigonometric functions.
47. Evaluate compositions of trigonometric and inverse trigonometric functions.
48. Use reciprocal trigonometric identities, quotient identities, Pythagorean identities, co-function identities and odd and even identities to simplify trigonometric expressions and solve trigonometric equations.
49. Establish trigonometric identities.
50. Apply identities for the cosine, sine and tangent of a difference or sum.
51. Apply the sum and difference formulas, double angle formulas and half-angle formulas.
52. Use trigonometric concepts to solve equations and real world problems.
53. Convert equations between logarithmic form and exponential form.
54. Convert between radians and degrees.
55. Define and evaluate the six trigonometric functions in terms of the lengths of the sides of a right triangle, the rotation of a ray in standard position, and a point on a unit circle.
56. Find exact values of trigonometric functions and use the calculator to approximate values.
57. Determine the range, domain, and period of trigonometric functions.
58. Graph the six trigonometric functions, and transformations of these graphs.
59. Apply the concepts of trigonometry to solve real world problems
60. Derive the Law of Sines and use it to solve triangles.
61. Use the Law of Sines to solve application and navigation problems involving heading.
62. Use the Law of Sines to solve triangles given the ambiguous case.

63. Derive the Law of Cosines and use it to solve triangles.
64. Use the Law of Cosines to solve application problems.
65. Develop three formulas for finding the area of any triangle given SSS, SAS or ASA.
66. Apply area formulas to solve problems.
67. Determine and graph vectors in component form.
68. Add, subtract and perform scalar multiplication with algebraic vectors.
69. Represent vectors in terms of horizontal and vertical vectors and unit vectors.
70. Use vector operations to solve problems.
71. Determine the dot product of two vectors, and use the dot product to determine the angle between two vectors.
72. Use vectors to solve work/force problems.

**(OPTIONAL)**

1. Simplify complex numbers.
2. Add, subtract, multiply and divide complex numbers.
3. Represent complex numbers in trigonometric form and perform operations on them.
4. Convert between trigonometric and rectangular form
5. Use DeMoivre's Theorem to find powers of complex numbers
6. Divide complex numbers.
7. Graph complex numbers in a coordinate system