Mathematics
Course Profiles

Torrey Pines High School
Math Department

Choosing Your Math Course

Introduction

For many students decisions about classes are easy. “I’m doing well in my Pre-Algebra class, so now it is time to sign up for Algebra I” or “I’m enjoying my Geometry class and I need at least one more year of math, so Algebra II is the next class for me.” However, there are certain times in the high school experience where decisions about mathematics classes are tougher since more options are available to students.

Experience has shown that successful math students come to class ready to learn with a positive attitude and a willingness to ask questions. The course profiles for mathematics are designed to help you make better decisions about which math classes to take at Torrey Pines. Note that each profile contains two parts: (1) the background students should have before entering a course and (2) what students can expect when taking the course. These profiles are *not* comprehensive lists of all topics that students should know nor are they lists of all topics taught in each course. The profiles are designed as overviews and are based on the California Content Standards for Mathematics as well as the experience of several math teachers who have taught these courses for multiple years. The math course profiles are available in the counseling office or on the Math Department web site (http://teachers.sduhsd.net/tpmath).

Making a Decision

If you are unsure about which math class will be best for you, be sure to talk with your current math teacher. Your teacher knows the differences among the classes you could take next year and can also advise why one class may suit your needs better than another. For some students, the decision is also based on whether to take the honors or college-prep level of a particular course. Refer to the specific course profiles and section introductions for more details, but keep in mind the following items as you consider your decision.

★ The honors courses progress at a quicker pace than the corresponding college-prep course. More material is covered at a deeper level. Students who enjoy engaging in challenging mathematical thinking can learn a lot and find success in the honors classes.

★ Since more content is taught in the honors courses, students are expected to know more when entering the next honors level. (This is also important in non-consecutive levels. For example, Algebra II/Trig. Honors builds on the Algebra I Honors curriculum which includes many more topics than the standard Algebra I curriculum.)

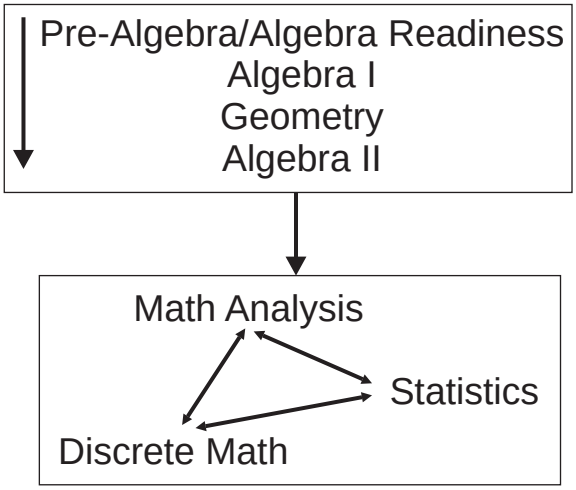
★ Students taking honors courses must consider how they will handle the stress of their overall school schedule. Even when students try their best, it is not always possible to earn an “A” in every class. Passionate, engaged students will find success, but success is personal and not only defined by grades.

★ Earning an “A” in a college-prep course does *not* necessarily mean that student belongs in honors the following year. This is especially true if the “A” was earned through continuous, repetitive, good effort rather than a passion for mathematics. In the college-prep courses, students with a solid work ethic and a desire for success will continue to enjoy and learn from a variety of challenging problems and activities.

Most math classes begin with some review of previously learned material. This explores the material with new depth and helps align the backgrounds of students. While beginning with review can be helpful, it is often difficult to base a decision about proper placement on the experiences within the first few weeks of class. Students may get a sense of overconfidence in a course and can be surprised when new material is too difficult, and this difficulty may arise after it is too late to drop the course. Also, less time is spent on review (at the beginning of a course and throughout the year) in higher-level courses.

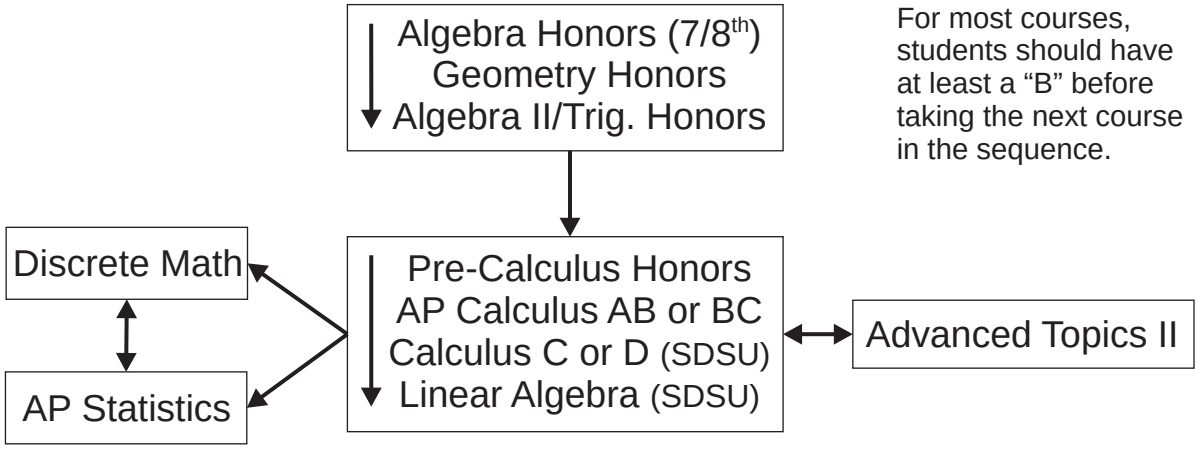
Recommended Pathways for TPHS Math

College-Preparatory Courses



For most courses, students should have at least a "C" before taking the next course

Honors Courses



For most courses, students should have at least a "B" before taking the next course in the sequence.

www.tpmath.net

The diagrams above show the course sequence students should follow when choosing math classes. This is the recommendation of the Math Department. Students are not locked into one particular path. However, students who would like to take a course out of sequence should discuss this with their current math teacher and may need to have a waiver on file with the counselor before enrolling. For more details about specific course recommendations, please refer to the course profiles and frequently asked questions on the Math Department web site.

Revised 02/2008

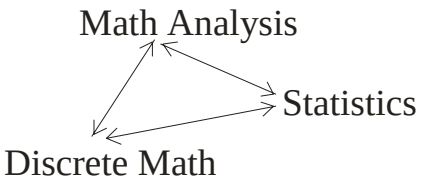
TP Math Course Changes

Changes are allowed only if there is space available and the student has not yet received credit for the course. It is important to note that the course material is covered in a different order in honors than in the corresponding college-prep courses. If students change levels, they may find gaps in their background and may have to do additional work even if changing to an "easier" level. ***Students are responsible for learning all of the course content, including the material covered at the very beginning of the class.***

Students may change class levels during the first few weeks of the semester according to the deadline dates set by the SDUHSD School Board. Changes may occur in either direction before the first day of school. After school begins, changes may only be made in the directions indicated below.

Algebra Readiness → None
Algebra I → Algebra Readiness
Geometry → None
Geometry Honors → Geometry
Algebra II → None
Algebra II/Trigonometry Honors → Algebra II

Students must complete Algebra I, Geometry, and Algebra II before taking the courses listed below.



PreCalculus Honors → Math Analysis
AP Calculus AB → PreCalculus Honors
AP Calculus BC → AP Calculus AB
Calculus C, Calculus D, & Linear Algebra → AP Statistics
AP Statistics → Statistics

Advanced Topics in Mathematics (Math Center Tutoring), when offered, is an option for strong students who have completed Algebra II with a B or higher. Advanced Topics in Mathematics II is an option for students who are currently enrolled in or have completed Calculus. Students with a strong interest in math and science should not replace taking Calculus with either of these courses.

Business Math is offered by the Business Department. Students may take Business Math for mathematics credit if they have passed Algebra I. Please note that Business Math is NOT a standards-based course for preparation to pass the High School Exit Exam, Algebra I, or mathematics courses in college.

For more information and details about courses, visit **www.tpmath.net**.

Mathematics Requirements for UC/CSU Admission

Within the "a-g requirements" for UC admission, Mathematics is listed as:
3 Years Required, 4 Years Recommended

The UC and CSU systems start counting year-long, college-preparatory math courses with Algebra I whether it is taken in middle school or high school.

Year	Category	Fulfilled by Taking:
1	Algebra 1	Algebra I – Note: This also counts if taken in 7th or 8th grade.
2	Geometry	Geometry or Geometry Honors
3	Algebra 2	Algebra II or Algebra II/Trigonometry Honors
4	Advanced Mathematics	Math Analysis with Trigonometry, PreCalculus Honors, AP Calculus AB, AP Calculus BC, Statistics, AP Statistics, Discrete Math, or Adv. Topics (Math Tutor)

"Mathematics Requirements" and "Statement on Competencies in Mathematics Expected of Entering College Students" published by the University of California:

"Although only three years are required, four years are strongly recommended. Among regularly admitted freshmen, most complete a mathematics course in each grade from 9th through 12th. . . Traditionally, most entering college freshmen have taken pre-calculus and often calculus; however, other advanced courses such as statistics and discrete mathematics can also deepen students' understanding of mathematics."

"For proper preparation for baccalaureate level course work, all students should be enrolled in a mathematics course in every semester of high school. It is particularly important that students take mathematics courses in their senior year of high school, even if they have completed three years of college preparatory mathematics by the end of their junior year. Experience has shown that students who take a hiatus from the study of mathematics in high school are very often unprepared for courses of a quantitative nature in college and are unable to continue in these courses without remediation in mathematics."

"Students who take calculus in high school are encouraged to take one of the Advanced Placement (AP) Calculus Examinations in order to place out of the comparable college calculus course."

If you have further questions, please consult your math teacher or counselor.

Updated: 2/2009

SDUHSD Graduation Requirements for Mathematics

Course Requirements: Three courses of Mathematics in grades 9 - 12. One course of the mathematics requirement may be earned by passing a college preparatory course (Algebra I, Geometry, Algebra II) in grade 8. In grades 9 - 12, one course of the mathematics requirement may be earned in a department other than the Mathematics Department.* Beginning with the graduating class of 2003-2004, Algebra I (or a course equivalent) will be required for graduation.

Exit Exam: Beginning in the 2005-2006 school year and each year thereafter, each student completing grade 12 shall successfully pass the state exit examinations in language arts and mathematics as a condition of high school graduation.

*Business Math is taught in the Business Department.
References: SDUHSD School Board Policy 6200.I.B.2, Senate Bill 1354, Education Code 60851

Course Profiles

The course profiles are organized into three categories.

Beginning High School
- Algebra Readiness
- Algebra I
- Geometry
- Geometry Honors

Intermediate Courses
- Algebra II
- Algebra II/Trigonometry Honors
- Pre-Calculus
- Statistics
- Discrete Mathematics

Advanced and College-Level Courses
- Math Analysis with Trigonometry
- AP Calculus AB
- AP Calculus BC
- Calculus C (SDSU Math 151 - Calculus II)
- Calculus D (SDSU Math 252 - Calculus III)
- Introduction to Linear Algebra (SDSU Math 254)
- AP Statistics and Probability
- Advanced Topics in Mathematics
- Advanced Topics in Mathematics II

Beginning High School

Most students enroll in Algebra I or Geometry for their freshman year, depending on how they did in eighth grade and how prepared they feel for high school course work. Students with a talent and passion for mathematics who successfully complete Algebra I Honors usually take Geometry Honors. Some advanced freshmen who have also accelerated their math program will take Algebra II/Trigonometry Honors. Other students, who need more work on fundamentals or would like additional practice, take Introduction to Algebra for a year before starting Algebra I.

- Introduction to Algebra
- Algebra I
- Geometry
- Geometry Honors

Algebra Readiness
Readiness Profile & Course Expectations

Prerequisites: None.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background
Students entering **Algebra Readiness** should ***already*** have a good understanding of the following concepts:

- Multiplication tables up to 10 x 10.
- Arithmetic with positive numbers (integers, fractions, and decimals).
- Basic understanding of exponents.

Students entering **Algebra Readiness** should also be able to solve problems such as

Example Arithmetic Problems: 1) $14 - 3 + 7$ 2) $\frac{3}{7} + \frac{2}{7}$ 3) $6 \bullet 8$ 4) Simplify: 4^3	Word Problem: Jim scored 80 points on Test 1, 76 points on Test 2 and 84 points on Test 3. How many total points did Jim score?
Graphing Problem: Plot the value 3 on a number line.	Number Sense Problem: 1) Order least to greatest: 8, 12, 7 2) Which is bigger: 37.5 or 3.75 ?

Students entering **Algebra Readiness** are expected to do the following things:

- Bring materials and completed homework to class every day.
- Copy problems from the textbook to a separate piece of paper correctly.
- Show work on assignments and tests.
- Be respectful to the other students and the teacher.

Course Content and Expectations

In **Algebra Readiness**, students will learn concepts such as:

- Solving one-variable equations.
- An introduction to graphing.
- An introduction to and practice with word problems.
- Identify like terms.
- Continued practice with arithmetic of positive and negative numbers.

Textbook: *Algebra Readiness*, Glencoe 2008, Price.

Students will be expected to spend an average of approximately ½ to 1 hour outside of class on homework for each class period. Approximately 1 section of the text is covered per class and one chapter every 5 weeks. Each semester will have approximately 4 tests and 8 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 60 – 80%
- Homework: 20 – 30%
- Class participation and bringing materials to class will also be included in grades.

Test Scores

Other indicators of potential success in **Algebra Readiness** include test scores near or above the following values:

- California Standards Test (CST) for 7^{th} Grade Standards: Basic

Algebra I
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Introduction to Algebra or Pre-Algebra.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background
Students entering **Algebra I** should ***already*** have a good understanding of the following concepts:

- Adding, subtracting, multiplying, and dividing integers (positive and negative numbers), fractions, and decimals.
- Solving one-step equations with variables.
- Using proper order of operations.

Students entering **Algebra I** should also be able to solve problems such as

Example Equation Problems: 1) $-3x = -12$ 2) $x - 5 = -13$	Word Problem: Dana's total for test points after the third test is 248. She scored 87 and 81 on the last two tests. What did she score on the first test?
Graphing Problem: Plot the points (3, 1), (0, -5), and (-1, 4) on coordinate axes.	Number Sense Problem: Fill in each box with the appropriate symbol: >, <, or = 1) -3 -10 2) ¾ 0.75

Students entering **Algebra I** are expected to do the following things:

- Bring materials and completed homework to class every day.
- Copy problems from the textbook to a separate piece of paper correctly.
- Show work on assignments and tests.
- Be respectful to the other students and the teacher.
- Ask questions and seek help when the material gets confusing.

Course Content and Expectations

In **Algebra I**, students will learn concepts such as:

- Simplifying expressions and solving equations and inequalities.
- Working with exponents and simple rational expressions including variables.
- Graphing and understanding properties of lines.
- Factoring and solving quadratic equations.
- Explaining the steps for solving a problem.

Textbook: *Algebra I*, Prentice Hall 2009, Bellman, et al.

Students will be expected to spend an average of approximately 1 hour outside of class on homework for each class period. Approximately 2 sections from the text are covered per class and one chapter every 3 weeks. Each semester will have approximately 7 tests and 7 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 60 – 80%
- Homework: 20 – 30%

There may also be projects such as

- Presenting problems to the class.
- Designing and presenting posters about math history and/or problem solving.
- Graphing activities.

Test Scores

Other indicators of potential success in **Algebra I** include test scores near or above the following values:

- California Standards Test (CST) for 7^{th} Grade Standards: Basic
- MDTP for Algebra Readiness: 70%

Other Comments:

Skills developed in Algebra I build the foundation for all following math classes. Students need to work toward mastery so that they will be better able to apply the skills in more complex problems.

Geometry
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Algebra I.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background
Students entering **Geometry** should ***already*** have a good understanding of the following concepts:

- How to solve multi-step single variable equations.
- How to solve quadratic equations.
- How to solve proportions.
- How to solve a system of equations

Students entering **Geometry** should also be able to solve problems such as

<table>
<tr>
<td>Example Equation Problems:

1) $2x + 5 = 15$

2) $6x + 5 – 2x = 8x - 20$</td>
<td>Quadratic Equation:
$x^2-5x + 6 = 0$ Solve using the
Solve by factoring: Quadratic Formula:
$(x-2)(x-3)=0$ $x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(6)}}{2(1)}$
$S = \{2,3\}$</td>
</tr>
<tr>
<td>Word Problem:

The long side of a rectangle is four times its shorter side. If the shorter side is 3 feet, what is the length of the longer side?</td>
<td rowspan="3">Explain an Equation Problem:
$2(x+4) = 5x + 14$
$2x + 8 = 5x +14$ First I distributed the 2 into the x+4.
$-2x \quad -2x$ Then, I subtracted 2x from both sides
$8 = 3x + 14$ to get all the x terms on the right.
$-14 \quad -14$ Then, I subtracted 14 from both sides
$-6 = 3x$ to get the numbers on the left.
$x = -2$ Then, I divided both sides by -3 to get 1x. Therefore, x = -2.</td>
</tr>
<tr>
<td>Systems of Equations:
$2x+3y = 8$
$x - 3y = 1$</td>
</tr>
<tr>
<td>Proportions:
$\frac{x+3}{7} = \frac{2x+4}{5}$</td>
</tr>
</table>

Students entering **Geometry** are expected to do the following things:

- Complete ALL homework problems with a thorough understanding of the concepts covered.
- Take detailed notes and use the notes as "guidelines" when completing homework.
- Identify "trouble" areas or concepts they do not understand and get help immediately.
- Be able to keep an organized notebook/binder.
- Keep all work and use old work to better understand current work.

Course Content and Expectations

In **Geometry**, students will learn concepts such as:

- Reasoning and the deductive thought process. This will be developed through the practice and mastery of two-column proofs.
- Basic properties of polygons and circles. The students will apply these properties to solve multi-step algebraic equations. The types of equations used are: two equations with two unknowns, quadratic and multi-step single-variable problems.
- Special right triangles. A thorough exploration of simplifying radicals will be performed.
- Area and volume problems.
- Other topics may include transformations, constructions, and coordinate geometry.

Textbook: *Geometry*, Prentice Hall 2009, Bass, et al.

Students will be expected to spend an average of approximately 1 hour outside of class on homework for each class period. Approximately 1 to 2 sections from the text will be covered per class and one chapter every 2 to 3 weeks. Each semester will have approximately 6 tests and 6 quizzes. A cumulative final exam will be given at the end of each semester. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 60 – 80%
- Homework: 20 – 35%

There may also be projects such as:

- Group problem solving followed by group presentations.
- Open ended problems that are applications of the content being covered. These are often times called Problems of The Week.
- Challenge problems, which may consist of detailed diagrams and a single page write-up.

Test Scores

Other indicators of potential success in **Geometry** include test scores near or above the following values:

- California Standards Test (CST) for Algebra I: Proficient
- MDTP for Geometry Readiness: 70%

Geometry Honors
Readiness Profile & Course Expectations

Prerequisites: "B" or higher in Algebra I Honors (both semesters)
OR approved waiver form on file with the counselor.

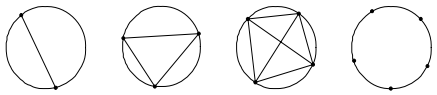
Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background

Students entering **Geometry Honors** should ***already*** have a good understanding of the following concepts:

- Demonstrating algebraic proofs using appropriate properties.
- Solving and graphing algebraic equations including quadratics and absolute values.
- Setting up and solving word problems.
- Using basic trigonometry.
- Solving proportions and simplifying radical expressions.
- Determining the equation of a line given certain criteria including two points, point and slope, parallel and perpendicular lines. Also, sketching graphs of these equations.

Students entering **Geometry Honors** should also be able to solve problems such as

<table>
<tr>
<td>Example Equation Problems:
Prove $a(b - c) = -ac + ab$ using algebraic properties and two-column form.
$7-(2x-6)=x-9$
$a-3=2a-6$
$w^2-5w=36$</td>
<td>Word Problem:
The sum of the measures of an acute angle and an obtuse angle is 140. The sum of twice the supplement of the obtuse angle and three times the complement of the acute angle is 340. What are the measures of the angles?</td>
</tr>
<tr>
<td>Graphing Problems:
$2(3\lvert a\rvert-1)\le 10$
$2x-7y=16$
$y=x^2+7x+4$
Graphing and expressing compound inequalities such as $a \le b < c$ including "and" and "or" statements.</td>
<td>Number Sense Problem:
 
Points: 2 3 4 ?
Regions: 2 4 8 ?</td>
</tr>
</table>

Students entering **Geometry Honors** are expected to do the following things:

- Read the textbook.
- Analyze problems.
- Take notes.
- Work in groups.
- Make presentations.
- Keep a well-organized notebook.
- Accept responsibility for his/her own learning.
- Make up missed work promptly – course moves so quickly, student cannot afford to get behind.
- Initiate any requests for help from teacher or other outside sources (tutoring centers).
- Have a strategy for solving unique problems (problems are not repetitious).
- Be able to use a calculator, but also be able to work through complex problems *without* a calculator.

Course Content and Expectations

In **Geometry Honors**, students will learn concepts such as:

- Constructing complex geometric proofs in various formats.
- Trigonometry and special right triangles along with an introduction to trigonometric identities and proofs.
- Relationships between circles, tangents, secants, and inscribed angles.
- Properties of plane figures (congruent and similar figures, area, perimeter, half-lines, half- planes).
- Properties of three-dimensional figures (lateral area, total area, surface area).

Textbook: *College Geometry*, 2nd edition, Pearson Prentice Hall 2008, Musser, et al.

Students will be expected to spend an average of approximately 1.5 hours outside of class on homework for each class period. Approximately 2 to 3 sections from the text are covered per class and one chapter every 2 weeks. Each semester will have approximately 8 tests and 8 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Supplemental unit on proofs with some proofs containing up to 25 steps.
- Coordinate geometry proofs.
- Transformations and Constructions Project.

Test Scores

Other indicators of potential success in **Geometry Honors** include test scores near or above the following values:

- STAR/California Standards Test (CST) for Algebra I: Advanced
- CAHSEE: Absolutely has to pass.

Other Comments

An honors-level course requires honors-level attitude, work ethic, and responsibility. The course work goes into far greater detail than college-prep geometry on every concept.

Intermediate Courses

After successfully completing Geometry, students take Algebra II. Algebra II/Trigonometry Honors includes much more content than college-prep Algebra II since trigonometry is taught at this level within the honors sequence. Students who complete Algebra II have a choice of college-prep electives to take the following year: Math Analysis, Statistics, or Discrete Mathematics. Math Analysis is designed to give students an analysis background before entering college-level calculus classes. (Note that trigonometry is included in the Math Analysis curriculum within the college-prep sequence. Students should not jump from college-prep Algebra II to Pre-Calculus Honors because they will miss the bulk of trigonometry needed for advanced courses.) Statistics and Discrete Mathematics are courses that teach data analysis and logical reasoning. Students will participate in a variety of projects gain many skills in both courses.

- Algebra II
- Algebra II/Trigonometry Honors
- Math Analysis with Trigonometry
- Statistics
- Discrete Mathematics

Algebra II
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Algebra I and Geometry.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background
Students entering **Algebra II** should ***already*** have a good understanding of the following concepts:

- Solving multi-step algebraic equations (i.e., Solve: 4(3x - 5) = 2(x – 8) – 6x)
- Multiple methods of graphing linear functions and related vocabulary (i.e., slope-intercept form, etc.)
- Factoring all types of quadratic polynomials (i.e., $2x^2-11x+5=(2x-1)(x-5)$) and simple cubic (third-degree) polynomials
- How to simplify a radical (i.e., $\sqrt{48}=4\sqrt{3}$)

Students entering **Algebra II** should also be able to solve problems such as

Example Equation Problem: Solve for *x*: $\frac{1}{3}x+\frac{1}{4}=x-\frac{1}{6}$	Word Problem: You have 480 ft of fencing to enclose a rectangular garden. You want the length to be 30 ft greater than the width. Find the length and width if you use all of the fencing.
Graphing Problem: Graph: 2x + 3y = 12	Number Sense Problem: Write the following in increasing order: $-2, 0.2, -\pi, -\sqrt{6}, \frac{6}{5}$

Students entering **Algebra II** are expected to do the following things:

- Be in class and participate every class period.
- Make-up assignments on their own when they are absent.
- Show all work and effort on every assignment.
- Ask questions and self-advocate when they are confused.
- Accept a challenge, analyze and think critically.

Course Content and Expectations

In **Algebra II**, students will learn concepts such as:

- Graphing and solving quadratic and higher degree polynomial functions as well as exponential and logarithmic functions.
- Components and graphs of conic sections (parabola, circle, ellipse, hyperbola).
- Introduction to Trigonometry (including the graphs of sine and cosine functions).

Textbook: *Algebra 2*, McDougal Littell 2008, Larson, et al.

Students will be expected to spend an average of approximately 1 to 2 hours outside of class on homework for each class period. Approximately 1 to 2 sections from the text will be covered per class and one chapter every 2 to 3 weeks. Each semester will have approximately 6 tests and 6 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 65 – 80%
- Homework: 20 – 30%

There may also be projects such as

- Compound interest real-life application project
- Graphing trigonometric functions design project
- Group presentations

Test Scores

Other indicators of potential success in **Algebra II** include test scores near or above the following values:

- California Standards Tests (CST) for Algebra I and Geometry: Proficient
- MDTP for Algebra II Readiness: 70%

Other Comments

Algebra II is a conceptual course that requires a great deal more effort and abstract thought than in previous math courses. Strong Algebra I skills, attendance, and a consistent effort on homework are critical to success. The knowledge, skills, and problem-solving strategies learned in Algebra II will lay a necessary foundation for Pre-Calculus and higher-level math courses.

Algebra II / Trigonometry Honors
Readiness Profile & Course Expectations

Prerequisites: Grade of "B" or better in both Algebra I Honors and Geometry Honors (both semesters) OR an approved waiver form on file with the counselor.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background

Students entering **Algebra II / Trigonometry Honors** should ***already*** have a good understanding of the following concepts, and be able to solve the problems below in the grid quickly without a calculator:

- Simplifying algebraic expressions.
- Graphing linear functions quickly, and other functions by point plotting if necessary.
- Solving linear equations and quadratic equations (factoring and quadratic formula).
- Basic trigonometry including the unit circle.

Simplification of Expressions:	Solving Equations:
$3x^2y(-\frac{2}{3}xyz-4)+5x^2y$ $\frac{4}{x-3}-\frac{3}{x+2}$ $\frac{2}{3}\quad\frac{-3}{5}+\frac{4}{7}$ $(x-3)^3$	$5x-6=13$ $3(x-5)=2-3(5x+2)-x$ $(x-3)(2x+5)=0$ $x^2-4=12$ $2x^2-3x-5=0$
Graphing Functions: $y=-2x+4$ $\quad 4x-5y=7$ $\quad y=x^2-x+3$ $\quad y=x^3$	

Students entering **Algebra II / Trigonometry Honors** should also consider that this course is specifically designed to meet the needs of students who

- Enjoy the challenges of problem solving (really!).
- Learn concepts quickly, as the class is taught at an accelerated pace.
- Are highly self-motivated and good at working both independently and cooperatively.
- Have great work ethic.
- Possess a high degree of intellectual curiosity.

Course Content and Expectations

In **Algebra II / Trigonometry Honors**, students will learn concepts such as:

- Cubic and higher-degree polynomials, exponential and logarithmic functions.
- Use matrices to solve systems of equations.
- Rational functions, parametric and polar equations and systems.
- Conic sections (including polar forms).
- Other topics including sequences, series, probability, and complex numbers.
- Trigonometric and inverse trigonometric functions and identities.
- Applications of trigonometry in solving triangle problems, and vectors.
- Applications of the various topics listed above.

Textbook: *Algebra and Trigonometry*, 2nd edition, Thomson Brooks/Cole 2007, Stewart, et al.

Students will be expected to spend an average of approximately 1.5 to 2 hours outside of class on homework for each class period. Approximately 2 to 4 sections from the text are covered per class. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 60 – 80%
- Homework: 10 – 25%

Test Scores

Other indicators of potential success include test scores near or above the following values:

- California Standards Tests (CST) for Algebra I and Geometry: Advanced
- MDTP for Algebra II Readiness: 85%

Math Analysis with Trigonometry
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Algebra II ("B" or higher is preferred).

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions

Student Background
Students entering **Math Analysis** should ***already*** have a good understanding of the following concepts: (For examples of each, please refer to the following page and the corresponding numbers.)

- Simplifying complex fractions. (1)
- Factoring polynomials into linear factors. (2)
- Using properties of exponents. (3)
- Using conjugates. (4)
- Simplifying rational expressions. (5)
- Simplifying trigonometric expressions without a calculator. (6)
- Evaluating logarithmic expressions without a calculator. (7)
- Solving quadratic equations using factoring, completing the square, quadratic formula.(8)
- Graphing and the effects of changing coefficients and constants for polynomials, absolute value, exponential, logarithmic, and basic trigonometric functions. (9)

Students entering **Math Analysis** should also be able to solve problems such as

Equation Problem: Solve for x: $\frac{2}{x-3}+\frac{5}{x+3}=1$	Word Problem: You are building a solid concrete ramp that slopes upward (imagine a wedge shape). The width is 3 times the height. The length is 5 ft more than 10 times the height. If 150cubic ft of concrete is used, find the dimensions of the ramp.
Graphing Problem: Graph the following: $y=-3(x+2)^2+1$ $y=-2(x+2)^2(x-1)$ $y=\cos x+2$	Number Sense Problem: Order the following in increasing order: $\sin\frac{\pi}{2},\quad -4i^6,\quad \ln 1,\quad \sqrt[3]{16},\quad \frac{(-2)^3}{2^2},\quad -\log_2 8$

Students entering **Math Analysis** are expected to do the following things:

- Analyze and think critically.
- Ask questions and self-advocate when confused.
- Explain problem-solving strategies using appropriate math terminology.
- Show all work and effort on assignments.
- Be in class and participate every class period.

Course Content and Expectations

In **Math Analysis** students will learn concepts such as

- Graphing and solving polynomial functions of higher degree.
- Graphing and solving exponential and logarithmic functions.
- Graphing and solving trigonometric functions.
- Solving systems of linear equations using matrices.
- Understanding the components and graphs of conics sections.

Textbook: *Precalculus*, 3rd edition, Prentice Hall 2007, Blitzer.

Students will be expected to spend an average of approximately 1 to 2 hours outside of class on homework for each class period. Approximately 1 to 2 sections from the text will be covered per class and one chapter every 2 to 3 weeks. Each semester will have approximately 6 tests and 6 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 20 – 30%

Test Scores

Other indicators of potential success in **Math Analysis** include test scores near or above the following values:

- California Standards Test (CST) for Algebra II: Proficient
- MDTP for Pre-Calculus: 70%

Other Comments

Math Analysis builds on a strong understanding of Algebra II concepts. The course is taught with an emphasis on analyzing graphs, using concepts and theorems, and mathematical analysis. Many topics from Algebra II are reviewed, but the focus is on integrating procedural skills and conceptual knowledge so that students can successfully apply the principles to mathematical questions and applications. Trigonometry and matrices are thoroughly examined. This course is designed for students who desire to take Calculus. The Math Analysis curriculum will help students strengthen their skills and broaden their understanding of concepts to prepare for college-level Calculus.

(1) $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}$ (2) $\left(16x^4-1,\quad y^3+3y^2-4y-12\right)$ (3) $\sqrt[3]{24a^6b^5},\ \dfrac{x^{-3}}{x^{-4/3}}$ (4) $\dfrac{32}{\sqrt{7}-3i}$

(5) $\dfrac{6}{x^2-2}+\dfrac{2}{x-2}$ (6) $\sin\dfrac{5\pi}{3}$ (7) $\left(\log_{16}4,\quad 5^{\log_5 3},\quad \ln 1\right)$ (8) $\left(3x^2-5x=-7\right)$

(9) $\left(y=-3(x+2)^2+1,\quad y=(x-1)^2(x+3)(x+5),\quad y=2|x+3|-1,\quad y=3^x+2,\quad y=\log_3 x+2,\quad y=2\sin x\right)$

Statistics
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Algebra II.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions

Student Background
Students entering **Statistics** should ***already*** have a good understanding of the following concepts:

- Basic math skills, especially solving for variables in equations.
- Identifying slope from graphs, equations, and word problems.
- Students should also have strong reading skills to be able to understand and interpret a variety of word problems and explanations of concepts.

Students entering **Statistics** should also be able to solve problems such as

Equation Problem: Given $z = \frac{x - \mu}{\sigma}$ and z = 1.6, μ = 1.1 and σ = .025; find *x*.	Word Problem: Given the following data set, find the mean and the median. 2, 5, 3, 7, 5, 8, 6
Graphing Problem: Display the data in the word problem as a histogram or a bar chart.	

Students entering **Statistics** are expected to do the following things:

- Have a desire to learn this subject.
- Attend and participate in class every day.
- Thoroughly complete homework and reading assignments.
- Work in groups.
- Seek help when needed.

Course Content and Expectations

In **Statistics** students will learn concepts such as

- Graphically displaying and interpreting data.
- Probability, correlation, and regression.
- Statistical significance and inference.

Textbook: *Elementary Statistics*, 10th Edition, Pearson Prentice Hall 2007, Triola.

Students will be expected to spend an average of approximately ½ to 1 hour outside of class on homework for each class period. Approximately 1 to 2 sections from the text will be covered per class and one chapter every 2 weeks. Each semester will have approximately 8 tests and 8 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 50 – 70%
- Homework: 10 – 20%
- Projects: 15 – 35%

There may also be projects such as

- Gathering, displaying, and analyzing data.
- Group activities and labs to collect data and interpret results.

Test Scores

Other indicators of potential success in **Statistics** include test scores near or above the following values:

- California Standards Test (CST) for Algebra II: Basic (at least)

Other Comments

This course has an emphasis on the mathematics of statistics. While analysis will be taught, it is not the focus of the course. Tests of significance and inference testing are also developed. Students will participate in a variety of activities and will find that there is more reading than in previous math courses.

Discrete Math
Readiness Profile & Course Expectations

Prerequisites: "C" or higher in Algebra II.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions

Student Background
Students entering **Discrete Math** should ***already*** have a good understanding of the following concepts:

- Basic math skills, especially solving for variables in equations.
- Solve basic probability questions.
- Students should also have strong reading skills and to be able to understand and interpret a variety of word problems and explanations of concepts.

Students entering **Discrete Math** should also be able to solve problems such as

Equation Problem:	Word Problem:
Solve the system of equations: $x + 2y = 23$ $x + 3y = 4$	Given that Statement A is true, must Statement B be true also? Statement A: "If it is raining, I will get wet". Statement B: "I am wet, so it must be raining"
Number Sense Problem: If you have three kinds of bread, two kinds of meat, and four types of cheese, list the types of sandwiches can you make?	

Students entering **Discrete Math** are expected to do the following things:

- Have a strong desire to learn concepts that make you think in different ways than you are used to in math classes.
- Do some reading assignments outside of class
- Ask "How does this apply to life?" and help find answers.
- Seek help when needed.

Course Content and Expectations

In **Discrete Math** students will learn concepts such as

- Formal Logic including path and circuit theory
- Probability
- Social theories such as elections theories, apportionment theories, fair division theories and game theories
- Number sense/Mathematical reasoning including proofs and encryption
- Matrices/Linear Algebra as it applies to business and economics situations
- History of Math
- Finance models

Textbook: *For All Practical Purposes*, 7th edition, W.H. Freeman 2006, COMAP.

Students will be expected to spend an average of approximately 1 hour outside of class on homework for each class period. Approximately 1 section from the text will be covered per class and one chapter every 2 weeks. Each semester will have approximately 8 tests and 8 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 50 – 70%
- Homework: 10 – 20%
- Projects: 15 – 35%

There may also be projects such as

- History of Math project (oral presentation)
- Probability Project

Test Scores

Other indicators of potential success in **Discrete Math** include test scores near or above the following values:

- California Standards Test (CST) for Algebra II: Basic (at least)

Other Comments

This class is designed to show you how math works in everyday life. The emphasis is on the application of concepts.

Advanced and College-Level Courses

Students who successfully complete college-prep Math Analysis or Algebra II/Trigonometry Honors have several choices. Most students should take Pre-Calculus Honors before enrolling in Calculus. This will give students another year of background and practice before entering college-level classes. The Pre-Calculus Honors students get an introduction to mathematical analysis and a better foundation in trigonometry and working with other transcendental functions.

Advanced Placement (AP) courses are college-level courses taught in high school. Students take a test in the spring to determine whether they may earn college credits for the course. AP Calculus AB covers the topics typically taught in a first semester college calculus course. AP Calculus BC covers the topics typically taught in the first two semesters of the college calculus sequence. Calculus C, Calculus D, and Linear Algebra are three semester-long courses taught at Torrey Pines in conjunction with San Diego State University. AP Statistics and Probability is another college-level elective where students learn data analysis and analytical thinking skills.

- Pre-Calculus Honors
- AP Calculus AB
- AP Calculus BC
- Calculus C (SDSU Math 151 - Calculus II)
- Calculus D (SDSU Math 252 - Calculus III)
- Linear Algebra (SDSU Math 254 - Introduction to Linear Algebra)
- AP Statistics and Probability
- Advanced Topics in Mathematics*
- Advanced Topics in Mathematics II

*Advanced Topics in Mathematics is primarily peer math tutoring and working on projects at the Pre-Calculus level. To accommodate tutoring, students attend this class before and/or after the regular school day. Advanced Topics in Mathematics is not offered every year. Level I is *not* a prerequisite for level II.

Pre-Calculus Honors

Readiness Profile & Course Expectations

Prerequisites: "B" in Algebra II/Trigonometry Honors (both semesters) or "A" in Math Analysis (both semesters) OR approved waiver form on file with the counselor.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions

Student Background

Students entering **Pre-Calculus Honors** should ***already*** have a good understanding of the following concepts:

- SOLVING DIFFERENT TYPES OF EQUATIONS: Using factoring, square root properties, completing the square, quadratic formula, radical equations, rational exponents, absolute value.
- SOLVING DIFFERENT INEQUALITIES: Linear, absolute value, rational.
- COORDINATE PLANE FORMULAS: Distance formula, midpoint formula, standard circle equation.
- GRAPHING DIFFERENT EQUATIONS: For lines (slope-intercept form, point-slope form, standard form) and non-linear functions find *x*- and *y*-intercepts; use symmetry; solve systems of equations by graphing; graph using shifting, reflecting, and stretching of graphs, leading coefficient test, and asymptotes (vertical, horizontal, and slant).
- SOLVING POLYNOMIAL EQUATIONS OF HIGHER DEGREES: Long division, synthetic division, remainder theorem, factor theorem, rational zero test.
- KNOW AND USE COMPOSITE AND INVERSE FUNCTIONS
- TRIGONOMETRY: Unit circle, trigonometric identities, inverse trigonometric functions, graphing trigonometric functions, solving trigonometric equations and inequalities.

Students entering **Pre-Calculus Honors** should also be able to solve problems such as

Equation Problem: If $f(x) = x^2 + 5x + 2$, evaluate the following $f(x) = \dfrac{f(x+h) - f(x)}{h}$.	Trigonometry Problem: Verify identities: (1) $\cos x - \dfrac{\cos x}{1 - \tan x} = \dfrac{\sin x \cos x}{\sin x - \cos x}$ (2) $\csc^4 x - \cot^4 x = 2\csc^2 x - 1$
Graphing Problem: A parabola has an equation of the form $y = ax^2 + bx + c$. Find the equation for this parabola, given the points (2,2), (4,0), and (0,0).	Number Sense Problem: Three roots of a fourth degree polynomial are 2, 3, $1 + 2i$. Find the polynomial.

Students entering **Pre-Calculus Honors** are expected to do the following things:

- Learn concepts and skills quickly.
- Ask questions and self-advocate when confused.
- Show all work and effort on assignments.
- Handle the rigor of learning new concepts every day and use new concepts throughout the course.
- Quickly recall concepts and skills learned in previous lessons to do new concepts.
- Be prepared to do at least one hour of homework for each hour of class.

Course Content and Expectations

In **Pre-Calculus Honors** students will learn concepts such as

- Review of Algebra II/Trigonometry Honors: a variety of topics (such as the algebra of functions and complex numbers) will be reviewed and covered in more depth.
- Evaluating Limits: direct substitution, factor and reduce, multiply by conjugate, find common denominator, divide by highest power of variable.
- Finding Derivatives: by definition; product, quotient, and chain rules, trigonometric, logarithmic and exponential, implicit differentiation, and logarithmic differentiation.
- Applications of Derivatives: equations of tangent lines, relative extrema and inflection points, optimization word problems, related rates, position, velocity and acceleration word problems.
- Methods of Integration; numerical approximation by Reimann Sum and power, exponential, logarithmic, and trigonometric methods.
- Applications of Integration; area, volumes of solids of revolution, acceleration, velocity and position.

Textbook: *Calculus 1 with Precalculus*, 2nd edition, Houghton Mifflin 2006, Larson.

Students will be expected to spend an average of approximately 1 to 2 hours outside of class on homework for each class period. Approximately 1.5 sections from the text will be covered per class and one chapter every 3 weeks. Each semester will have approximately 5 tests and 5 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

Test Scores

Other indicators of potential success in **Pre-Calculus Honors** include test scores near or above the following values:

- California Standards Test (CST) for Algebra II: Proficient

AP Calculus AB

Readiness Profile & Course Expectations

Prerequisites: "A" in Math Analysis or "C" or better Pre-Calculus Honors.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background

Students entering **AP Calculus AB** should ***already*** have a good understanding of the following concepts:

Algebra I and II:

- Simplifying expressions, solving equations and inequalities (linear, polynomial, rational, radical, exponential, logarithmic, absolute value); solving systems of linear and polynomial equations.
- Writing equations of linear functions: slope-intercept form, point-slope form, etc.
- Graphing (and recognizing the graphs of) functions and relations including *x*- and *y*- intercepts, horizontal, and vertical asymptotes.
- Setting up and solving word problems involving the algebra skills listed above.

Trigonometry:

- Unit circle values (cos, sin, etc.) for the traditional multiples of $\frac{\pi}{6}$, $\frac{\pi}{4}$, $\frac{\pi}{3}$, $\frac{\pi}{2}$, and π.
- Identities (Pythagorean, sum and difference, half and double angle).
- Solving trigonometric equations and systems of equations.
- Graphs of trigonometric functions in the *xy*-plane. For example, $y = a \cos b(x - c) + d$.
- Application of trigonometry to geometric figures.

Geometry:

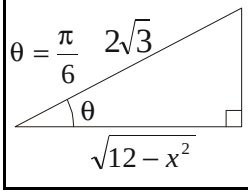
- Midpoint, slope, distance formulas.
- Area formulas for common plane figures.
- Lateral area, surface area, and volume formulas for common 3-D figures.

Students entering **AP Calculus AB** should also be able to solve problems such as

Algebra I and II: Sketch the graph of the following equations without a calculator.

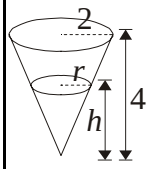
$y=mx+b$ $\quad y=1/x$ $\quad y=a(x+h)^2+k$ $\quad x^2+y^2=r^2$ $\quad y=\ln x$

$y=x^3$ $\quad y=|x+h|$ $\quad y=e^x,\ y=2^x$ $\quad y=\left(\frac{1}{2}\right)^x$



Trigonometry:

Solve for *x* without using a calculator.



Geometry:

Shown is a conical tank partially filled with water. Write the formula for the volume of the water as a function of only *h*.

Students entering **AP Calculus AB** are expected to do the following things:

- Learn concepts and skills quickly.
- Maintain proficiency in above skills as they are applied to new skills.
- Handle the rigor of learning new concepts every day and use new concepts throughout the course.
- Quickly recall concepts and skills learned in previous courses but needed in this course—there is no time to re-teach "old" skills.

Course Content and Expectations

In **AP Calculus AB**, students will learn concepts such as:

- Evaluating Limits: direct substitution, factor and reduce, multiply by conjugate, find common denominator, divide by highest power of variable – and later in course by L'Hospital's Rule.

- Finding Derivatives of polynomial functions, rational functions, exponential functions, logarithmic functions, trigonometric and inverse trigonometric functions: by definition; product, quotient, chain rules; trigonometric and inverse trigonometric; logarithmic and exponential; implicit differentiation; logarithmic differentiation.

- Applications of Derivatives: equation of tangent line; relative extrema and inflection points; optimization word problems; related rates word problems; position, velocity, and acceleration in function form.

- Methods of Integration: numerical approximation by Riemann Sum or Trapezoidal Rule; power, exponential, logarithmic, trigonometric and inverse trigonometric, algebraic substitution.

- Applications of Integration: area, volumes of solids of revolution, volumes of solids with known base and cross section, arc length; acceleration, velocity, and position; solve differential equations (variable separable and using slope fields).

Textbook: *Calculus: Early Transcendentals*, 6th edition, Brooks/Cole 2007, Stewart.

Students will be expected to spend an average of approximately 2 hours outside of class on homework for each class period. Approximately 1 section from the text is covered per class. Each semester will have approximately 4 tests and 4 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Activities and reports after the AP exam.

Test Scores

Other indicators of potential success in **AP Calculus AB** include test scores near or above the following values:

- Calculus Readiness Test: 70%

AP Calculus BC

Readiness Profile & Course Expectations

Prerequisites: "B" in Pre-Calculus Honors or "High A" in Algebra II/Trigonometry Honors. (Students coming from Algebra II/Trigonometry Honors should discuss skipping Pre-Calculus with their current teacher.)

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions. ***★Note: Even though the student background for AB and BC are almost the same, students need to be prepared to work at a much faster pace (with more material covered on each test) in the Calculus BC course. ★***

Student Background

Students entering **AP Calculus BC** should ***already*** have a good understanding of the following concepts:

Algebra I and II:

- Simplifying expressions, solving equations and inequalities (linear, polynomial, rational, radical, exponential, logarithmic, absolute value); solving systems of linear and polynomial equations.
- Writing equations of linear functions: slope-intercept form, point-slope form, etc.
- Graphing (and recognizing the graphs of) functions and relations including *x*- and *y*- intercepts, horizontal, and vertical asymptotes.
- Setting up and solving word problems involving the algebra skills listed above.

Trigonometry:

- Unit circle values (cos, sin, etc.) for the traditional multiples of $\frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$, and π.
- Identities (Pythagorean, sum and difference, half and double angle).
- Solving trigonometric equations and systems of equations.
- Graphs of trigonometric functions in the *xy*-plane. For example, $y = a \cos b(x - c) + d$.
- Application of trigonometry to geometric figures.

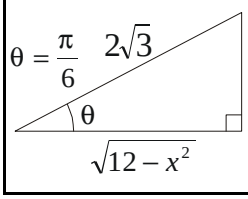
Geometry:

- Midpoint, slope, distance formulas.
- Area formulas for common plane figures.
- Lateral area, surface area, and volume formulas for common 3-D figures.

Students entering **AP Calculus BC** should also be able to solve problems such as

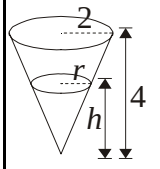
Algebra I and II: Sketch the graph of the following equations without a calculator.

$y=mx+b$ $y=1/x$ $y=a(x+h)^2+k$ $x^2+y^2=r^2$ $y=\ln x$ $y=x^3$ $y=|x+h|$ $y=e^x,\ y=2^x$ $y=\left(\frac{1}{2}\right)^x$



Trigonometry:

Solve for *x* without using a calculator.



Geometry:

Shown is a conical tank partially filled with water. Write the formula for the volume of the water as a function of only *h*.

Students entering **AP Calculus BC** are expected to do the following things:

- Learn concepts and skills very quickly.
- Maintain proficiency in above skills as they are applied to new skills.
- Handle the rigor of learning new concepts every day and use new concepts throughout the course.
- Quickly recall concepts and skills learned in previous courses but needed in this course—there is no time to re-teach "old" skills.

Course Content and Expectations

In **AP Calculus BC**, students will learn all of the concepts taught in AP Calculus AB (listed in plain text) as well as those listed below in **bold** text:

- Evaluating Limits: direct substitution, factor and reduce, multiply by conjugate, find common denominator, divide by highest power of variable – and later in course by L'Hospital's Rule.

- Finding Derivatives of polynomial functions, rational functions, exponential functions, logarithmic functions, trigonometric and inverse trigonometric functions, **parametric equations, polar equations, vector functions**: by definition; product, quotient, chain rules; trigonometric and inverse trigonometric; logarithmic and exponential; implicit differentiation; logarithmic differentiation.

- Applications of Derivatives: equation of tangent line **(including parametric equations, polar equations)**; relative extrema and inflection points; optimization word problems; related rates word problems; position, velocity, and acceleration in function form; **analyze motion of particle modeled in parametric form.**

- Methods of Integration: numerical approximation by Riemann Sum or Trapezoidal Rule; power, exponential, logarithmic, trigonometric and inverse trigonometric, algebraic substitution, **trigonometric substitution, parts, partial fraction decomposition.**

- Applications of Integration: area, volumes of solids of revolution, volumes of solids with known base and cross section, arc length; acceleration, velocity, and position.

- **Differential Equations:** separation of variables, slope fields**, Euler's Method of approximation, exponential growth, logistic growth model.**

- **Infinite Sequences and Series: tests for convergence and divergence, Taylor and Maclaurin Series.**

Textbook: *Calculus: Early Transcendentals*, 6th edition, Brooks/Cole 2007, Stewart.

Students will be expected to spend an average of approximately 2 to 3 hours outside of class on homework for each class period. Approximately 1 to 2 sections from the text are covered per class. Each semester will have approximately 3 tests and 6 to 8 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Final study project following the AP exam.

Test Scores

Other indicators of potential success in **AP Calculus BC** include test scores near or above the following values:

- Calculus Readiness Test: 85%

Calculus C (SDSU Math 151 Calculus II)
Readiness Profile & Course Expectations

Prerequisites: "3" or higher on the Advanced Placement (AP) Calculus AB Exam or the AB sub-score of the AP Calculus BC Exam.

Below are some guidelines for choosing the best course for an individual student. This *not* a placement test and it should *not* be used as the only criteria for making placement decisions. *There is no waiver for this course. Credit is granted through San Diego State University and students must have successfully completed the equivalent of college-level Calculus I.*

Student Background

Students entering **Calculus C** should ***already*** have a good understanding of the following concepts:

- Limits (graphically, numerically, and finding them algebraically).
- Derivatives of all functions (including trigonometric, inverse trigonometric, exponential, and logarithmic functions).
- Integration of standard functions (including all trigonometric functions) and solving integration problems using *u*-substitution.
- Students also need to have experience working with polar coordinates and need to know how to find the trigonometric and inverse trigonometric values corresponding to each standard angle on the unit circle *without a calculator or note sheet.*

Students entering **Calculus C** should also be able to solve problems such as

Limit Problem: Find $\lim_{x\to-\infty} \frac{\sqrt{x^2+4x}}{4x+1}$. What does this mean about the graph of the function?	Derivative Problem: Find $\frac{d}{dx}\left[\ln(e^{2x}\sec x^3)\right]$. Simplify your answer.
Integration Problem: Solve $\int_e^{e^4} \frac{3+\ln x}{x\sqrt{\ln x}}\,dx$.	Numerical Problem: Approximate the area under the graph of $f(x) = 25 - x^2$ from $x = 2$ to $x = 5$ using six rectangles with left endpoints. Sketch. Repeat with right endpoints and again with trapezoids. Compare to the exact answer.

Students entering **Calculus C** are expected to do the following things:

- Keep up with daily assignments without a daily check from the teacher.
- Work with classmates to solve problems and understand concepts.
- Prepare projects outside of class and give presentations in front of peers.
- Solve complex problems without the use of a calculator or note sheet.

Course Content and Expectations

In **Calculus C**, students will learn concepts such as

- Advanced Integration Techniques
- Infinite Sequences and Series
- Introduction to Differential Equations
- Formal Analysis of Limits
- Parametric Equations

Textbook: *Calculus: Early Transcendentals*, 6th edition, Brooks/Cole 2007, Stewart.

Students will be expected to spend an average of approximately 2 to 3 hours outside of class on homework for each class period. Approximately 1 section from the text will be covered per class and one chapter every 5 weeks. Each semester will have approximately 5 tests and no formal quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Presentations to the class
- Computer activities with the program *Mathematica*

Test Scores

Other indicators of potential success in **Calculus C** include test scores near or above the following values:

- Advanced Placement Calculus AB Exam: 4 or 5
- AB Sub-Score on AP Calculus BC Exam: 4 or 5
- Students who score a "3" on these exams are eligible for Calculus C, however they may find more success in AP Calculus BC.

Other Comments

Calculus C is a rigorous college course. Students are expected to spend significant amounts of time completing and understanding assignments, preparing projects, studying for exams, and reviewing material each week. As in most college courses, students in Calculus C have only a few opportunities to demonstrate understanding on tests and projects, therefore each assessment will have a significant impact on a student's grade.

Note that students who do not need the additional units for high school graduation are strongly encouraged to have the Calculus C course NOT appear on their high school transcripts. This makes it much more likely for colleges to accept the transfer units. More details are given in class.

Calculus D (SDSU Math 252 Calculus III)
Readiness Profile & Course Expectations

Prerequisites: "3" or higher on the Advanced Placement (AP) Calculus BC Exam or a "C" or higher in Calculus C.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions. *There is no waiver for this course. Credit is granted through San Diego State University and students must have successfully completed the equivalent of college-level Calculus I and II.*

Student Background

Students entering **Calculus D** should ***already*** have a good understanding of the following concepts:

- Limits (graphically, numerically, and finding them algebraically).
- Derivatives of all functions (including trigonometric, inverse trigonometric, exponential, and logarithmic functions).
- Integration of standard functions (including all trigonometric functions) and using advanced techniques such as integration by parts and trigonometric substitution.
- Students also need to know parametric equations, polar coordinates and graphs, equations and graphs of conic sections, and how to find the trigonometric and inverse trigonometric values corresponding to each standard angle on the unit circle *without a calculator or note sheet.*

Students entering **Calculus D** should also be able to solve problems such as

Derivative Problem: Find $\frac{d^2}{dx^2}\left[\ln\left(\sqrt{16-x^2-a^2}\right)\right]$.	Integration Problem: Solve $\int_1^4 \sqrt{t}\ln t\ dt$.
Graphing Problem: Sketch the graph for each of the following: (a) $\frac{x^2}{9}-\frac{y^2}{25}=1$, (b) $\frac{x^2}{9}+\frac{y^2}{25}=1$, (c) $-\frac{x^2}{9}+\frac{y^2}{25}=1$, (d) $\frac{x}{9}-\frac{y^2}{25}=1$	Parametric and Polar Problem: Sketch the graph of the given polar equation by first converting it to a Cartesian equation. $r=\tan\theta\sec\theta, \quad 0\le\theta\le\frac{\pi}{4}$ Write a set of parametric equations, including a domain for the parameter *t*, that graphs the same curve.

Students entering **Calculus D** are expected to do the following things:

- Keep up with daily assignments without a daily check from the teacher.
- Work with classmates to solve problems and understand concepts.
- Prepare projects outside of class and give presentations in front of peers.
- Solve complex problems without the use of a calculator or note sheet.

Course Content and Expectations

In **Calculus D**, students will learn concepts such as:

- Vectors and Graphs in Three-Dimensions
- Partial Derivatives
- Multiple Integrals
- Vector Fields and Vector Calculus

Textbook: *Calculus: Early Transcendentals*, 6th edition, Brooks/Cole 2007, Stewart.

Students will be expected to spend an average of approximately 2 to 3 hours outside of class on homework for each class period. Approximately 1 section from the text will be covered per class and one chapter every 4 weeks. Each semester will have approximately 5 tests and no formal quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Presentations to the class
- Computer activities with the program *Mathematica*

Test Scores

Other indicators of potential success in **Calculus D** include test scores near or above the following values:

- Advanced Placement Calculus BC Exam: 4 or 5
- Students who score a "3" on the above exam are eligible for Calculus D, however they may find more success in Calculus C. (Students are eligible for Calculus C if they score a "3" or higher for the AB sub-score of the AP Calculus BC Exam.)

Other Comments

Calculus D is a rigorous college course. Students are expected to spend significant amounts of time completing and understanding assignments, preparing projects, studying for exams, and reviewing material each week. As in most college courses, students in Calculus D have only a few opportunities to demonstrate understanding on tests and projects, therefore each assessment will have a significant impact on a student's grade.

Note that students who do not need the additional units for high school graduation are strongly encouraged to have the Calculus D course NOT appear on their high school transcripts. This makes it much more likely for colleges to accept the transfer units. More details are given in class.

Linear Algebra (SDSU Math 254 Introduction to Linear Algebra)
Readiness Profile & Course Expectations

Prerequisites: "3" or higher on the Advanced Placement (AP) Calculus BC Exam or a "C" or higher in Calculus C. *Students should take Calculus D before or concurrently with Linear Algebra.*

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions. *There is no waiver for this course. Credit is granted through San Diego State University and students must have successfully completed the equivalent of college-level Calculus I and II .*

Student Background

Students entering **Linear Algebra** should ***already*** have a good understanding of the following concepts:

- Systems of equations
- Parametric equations (including lines and planes in space)
- Vectors and operations with vectors
- Solving problems in two, three, and four dimensions
- Algebraic properties, axioms, and identities

Students entering **Linear Algebra** should also be able to solve problems such as

Vector Problem: For $\mathbf{u}$ = <1, 2, 3> and $\mathbf{v}$ = <-2, 7, 0> find $\text{proj}_{\mathbf{u}}\mathbf{v}$, the projection of $\mathbf{v}$ onto $\mathbf{u}$.	Plane Problem: Find the equation of the plane containing the points (1, 2, 3), (-2, 7, 0), and (5, -1, -1).
Parametric Equations and Systems Problem: Determine if the lines L_1 and L_2 are parallel, skew, or intersecting. If intersecting, find the point of intersection. L_1: $x = 5t - 7, \quad y = -t + 2, \quad z = 6t - 13$ L_2: $x = 3s + 6, \quad y = 2s + 2, \quad z = -2s - 3$	Properties Problem: Name each property illustrated: (a) $\mathbf{u} + \mathbf{v} = \mathbf{v} + \mathbf{u}$ (b) $\mathbf{u} + (-\mathbf{u}) = \mathbf{0}$ (c) $k(\mathbf{u} + \mathbf{v}) = k\mathbf{u} + k\mathbf{v}$ (d) If $\mathbf{u} = \mathbf{v}$ and $\mathbf{v} = \mathbf{w}$, then $\mathbf{u} = \mathbf{w}$.

Students entering **Linear Algebra** are expected to do the following things

- Keep up with daily assignments without a daily check from the teacher.
- Work independently and with classmates to solve problems and understand concepts.
- Read mathematical arguments, proofs, and examples.
- Prepare projects outside of class and give presentations in front of peers.
- Solve complex problems without the use of a calculator or note sheet.
- Develop proofs and write out mathematical arguments for solving problems.

Course Content and Expectations

In **Linear Algebra**, students will learn concepts such as

- Systems of Linear Equations and Matrices
- Determinants
- Euclidean and General Vector Spaces
- Inner Product Spaces
- Eigenvalues and Eigenvectors
- Linear Transformations

Textbook: *Elementary Linear Algebra*, 8th Edition, John Wiley & Sons 2000, Anton.

Students will be expected to spend an average of approximately 2 hours outside of class on homework, reading, and review for each class period. Approximately 1 section from the text will be covered per class and one chapter every 3 weeks. Each semester will have approximately 3 tests and no formal quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%

There may also be projects such as

- Presentations to the class
- Computer activities with the program *Mathematica*

Test Scores

Other indicators of potential success in **Linear Algebra** include test scores near or above the following values:

- Advanced Placement Calculus BC Exam: 4 or 5
- Students who score a "3" on the above exam are eligible for Linear Algebra, however they may find more success in Calculus C followed by Calculus D. (Students are eligible for Calculus C if they score a "3" or higher for the AB sub-score of the AP Calculus BC Exam.)

Other Comments

Linear Algebra is a rigorous college course. Students are expected to spend significant amounts of time completing and understanding assignments, preparing projects, studying for exams, and reviewing material each week. As in most college courses, students in Linear Algebra have only a few opportunities to demonstrate understanding on tests and projects, therefore each assessment will have a significant impact on a student's grade.

Note that students who do not need the additional units for high school graduation are strongly encouraged to have the Linear Algebra course NOT appear on their high school transcripts. This makes it much more likely for colleges to accept the transfer units. More details are given in class.

AP Statistics and Probability
Readiness Profile & Course Expectations

Prerequisites: "B" or higher in Algebra II or a "C" or higher in Math Analysis.

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions

Student Background
Students entering **AP Statistics and Probability** should ***already*** have a good understanding of the following concepts:

- Setting up and solving word problems using equations.
- Identifying slope from graphs, equations, and word problems.
- Students should also have strong reading skills to be able to understand and interpret a variety of word problems and explanations of concepts.
- Using graphing calculators.

Students entering **AP Statistics and Probability** should also be able to solve problems such as

Equation Problem: Use the formula below to solve for the standard deviation of the data set 1, 2, 3, 4, 5. $s^2 = \frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + ...(x_n - \bar{x})^2}{n-1}$	Word Problem: With a standard deck of 52 cards, what is the probability of getting 2 red cards?
Graphing Problem: Given a graph, identify characteristics such as range, center of data, and maximum and minimum values. Also, TI-83's will be used to graph data sets.	

Students entering **AP Statistics and Probability** are expected to do the following things:

- Have a strong desire to succeed this course.
- Be able to use and develop analysis skills.
- Attend and participate in class every day.
- Thoroughly complete homework and reading assignments.

Course Content and Expectations

In **AP Statistics and Probability** students will learn concepts such as

- Developing and using probability models.
- Analyzing and interpreting given data sets and graphs.
- Carrying out significance tests and interpreting results.

Textbook: *The Practice of Statistics*, 3rd edition, W. H. Freeman 2008, Yates, et al.

Students will be expected to spend an average of approximately 2 hours outside of class on homework for each class period. Approximately 1 to 2 sections from the text will be covered per class and one chapter every 2 weeks. Each semester will have approximately 8 tests and 5 quizzes. Grades will be calculated within the following guidelines:

- Tests and Quizzes: 70 – 80%
- Homework: 15 – 25%
- Projects: Approximately 20%

Examples of projects may include

- Friday Projects (analyze statistics related to current events)
- Developed Project (collect and analyze data)
- Semester Project (display data, carry out experiments, and interpret the data you collect)

Test Scores

Other indicators of potential success in **AP Statistics and Probability** include test scores near or above the following values:

- California Standards Test (CST) for Algebra II: Proficient

Other Comments

This course is about the mathematics of statistics and probability. Students will be expected to analyze situations and sets of data. Tests of significance and inference testing are also developed. Students will participate in a variety of activities and will find that there is more reading than in previous math courses.

Advanced Topics in Mathematics II
Readiness Profile & Course Expectations

Prerequisites: Successful completion of or concurrent enrollment in Calculus AB or BC. Students should *not* take this course instead of Calculus. (Note: Students may take this course without taking Advanced Topics in Mathematics I.)

Below are some guidelines for choosing the best course for an individual student. This is *not* a placement test and it should *not* be used as the only criteria for making placement decisions.

Student Background

Students entering **Advanced Topics in Mathematics II** should ***already*** have a good understanding of the following concepts:

- Functions (including composite functions, inverse functions, domain, range, etc.)
- Graphing all types of functions in two dimensions. Basic graphing in three dimensions.
- Trigonometry (functions, inverse functions, identities, graphing, unit circle values, etc.)
- Parametric Equations (graphing, converting to and from familiar algebraic forms)
- Basic Calculus (at least an introduction to limits, derivatives, and integrals)
- Vectors (notation, arithmetic, graphing, applications)

Students entering **Advanced Topics in Math II** should also be able to solve problems such as

Example Function Problem: What is the domain of $f(x(t), y(t))$ given $f(x, y) = \frac{x^2}{y}$, $x(t) = \ln t$, and $y(t) = \tan t$.	Calculus Problem: Find the derivative of $f(x) = (x-1)^2(x+2)^2$ and use your result to find the equation of the line tangent to $f(x)$ at $x = -1$. Graph the curve and line together.
Graphing Problem: Sketch the graph for each set of parametric equations. Indicate the orientation and state an appropriate domain. $x(t) = 3t - 4$ $\quad$ $x(t) = 3\cos t$ $y(t) = -2t + 5$ $\quad$ $y(t) = 4\sin t$	Vector Problem: Draw a sketch of an object being pulled by the forces $\mathbf{F}_1 = \langle 1, 5 \rangle$ and $\mathbf{F}_2 = \langle -4, 1 \rangle$. Draw the single vector that represents the total force acting on the object? What is the magnitude of this force?

Students entering **Advanced Topics in Mathematics II** are expected to do the following things:

- Keep up with assignments without a daily check from the teacher.
- Work independently and with classmates to solve problems and understand concepts.
- Read mathematical arguments, proofs, and examples.
- Prepare projects inside and outside of class and give presentations in front of peers.
- Solve complex and open-ended problems.
- Develop proofs and write out mathematical arguments for solving problems.
- Connect mathematics to other disciplines (such as physics, economics, or music).
- Think creatively from the perspective of a student and a teacher.
- Participate in community service through project design, testing, and implementation.