

# MATH

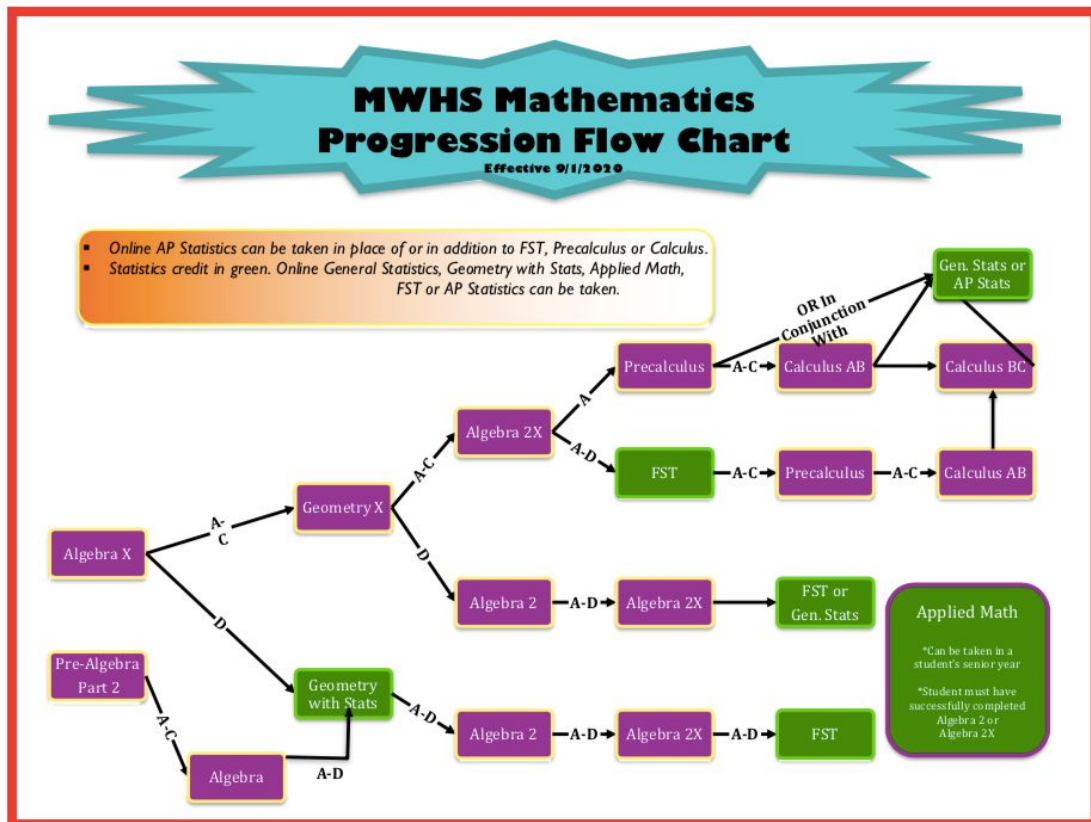
## MATH REQUIREMENTS FOR GRADUATION

1. All 8th and 9th graders are required to take a full year of mathematics.
2. All students must take 2 math credits throughout their 10th, 11th, or 12th grade years.
3. All students must take a math course encompassing statistics and probability.

This statistics and probability requirement may be met in one of the following ways:

- a. Students may take a year-long Geometry with Stats course.
- b. Students may take a semester-long Online General Statistics course in their 10th, 11th, or 12th grade years. This course may be taken in conjunction with other math courses.
- c. Students may take a year long FST course.
- d. Students may take a year long Applied Math Course (only offered senior year).
- e. Students may take a year long Online Advanced Placement Statistics course in which college credit could be earned based on an A.P. Exam test score. (Can be taken in conjunction with any course beyond Algebra 2X.)

**\* Note that all students must pass both semesters of a math course in order to advance to the next level math course. Students not advancing (or failing at semester) may, by consultation with their math teacher and guidance counselor, be placed in a more appropriate second semester math course.**



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## REQUIREMENTS TO MOVE FROM ONE MATH COURSE TO THE NEXT

The following information outlines the recommendations made by members of the math department.

### 8<sup>th</sup> Graders:

- Pre-Algebra Part II students must pass the second semester with a C- or better to move into Algebra. If an 8<sup>th</sup> grade student receives a Pre-Algebra Part II grade of D+ or lower, they will be enrolled in Pre-Algebra Part II as a 9<sup>th</sup> grader.
- Algebra X students must pass the second semester with a C- or better to move into Geometry X. If an 8<sup>th</sup> grade student receives an Algebra X grade of D+ or lower, they will be re-enrolled in Algebra X as a 9<sup>th</sup> grader or Geometry with Stats pending teacher recommendation.
- Geometry X students must pass the second semester with a C- or better to move into Algebra II X. If an 8<sup>th</sup> grade student receives a Geometry X grade of D+ or lower, they will be re-enrolled in Geometry X as a 9<sup>th</sup> grader or Algebra 2 pending teacher recommendation.

### 9<sup>th</sup> – 12<sup>th</sup> Graders:

- Algebra X students must pass the second semester with a C- or better to move into Geometry X. If a student receives a D+ or lower, they will either take Algebra X again or enroll in Geometry with Stats.
- Geometry X students must pass the second semester with a C- or better to move into Algebra II X. If a student receives a D+ or lower, they will either take Geometry X again or enroll in Algebra II.
- Algebra II X students must pass the second semester with a C- or better into move to FST. If a student receives a D+ or lower, they will take Algebra II X again or Algebra II, based on teacher recommendation.

## **Pre-Algebra Part 2**

**Course#:** A-S1 (0202) B-S2 (0203) – Full Year Course

**Grade Level:** 8 - 12

**Prerequisites:** None

**Course Description:** This course will cover the necessary material for students to be successful in Algebra. Concepts include real number computations, solving single variable equations and inequalities, exponential relationships, graphing linear equations, and basic geometric calculations.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard, hands-on discovery learning, class participation, student board work, coursework on Schoology, and real-life application projects. Assessments include daily homework, weekly quizzes and chapter tests. A course website is maintained giving students access to daily assignments, as well as quiz and test dates.



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**Basis for Student Success:** Ability to simplify using order of operations, combining like terms, compute and simplify real number calculations (integers, decimals, and fractions), and solve basic single-variable equations.

## Algebra

**Course#:** A-S1 (0206) B-S2 (0207) – Full Year Course

**Grade Level:** 8 - 12

**Prerequisite:** Pre-Algebra Part II; Teacher Recommendation

**Course Description:** This course will cover the necessary material required for Algebra Credit. Course content includes arithmetic computations, solving single-variable equations, graphing linear equations, solving and graphing linear inequalities, systems of equations, exponential functions, quadratic functions, as well as numerous connections to geometry. Throughout the course, students will master techniques for efficiently solving word problems.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of a whiteboard, hands-on discovery learning, class participation, student board work, coursework on Schoology, and real-life application projects. Assessments include daily homework, weekly quizzes and chapter tests. A course website is maintained giving students access to daily assignments, as well as quiz and test dates.

**Basis for Student Success:** Ability to simplify using order of operations, combining like terms, compute and simplify real number calculations (integers, decimals, and fractions), and solve basic single-variable equations.

**Minnesota State Standards:** Three main strands are addressed. Algebra strand focuses on understanding, recognizing, representing, solving and explaining functions in real-world and mathematical situations. Geometry & Measurement strand focuses on solving distance, midpoint, and Pythagorean Theorem examples using algebra. Data Analysis & Probability strand focuses on displaying and analyzing data, as well as simple and compound probability.

## Algebra X

**Course#:** A-S1 (0208) B-S2 (0209) – Full Year Course

**Grade Level:** 8 – 12

**Prerequisite:** Teacher Recommendation

**Course Description:** This course will cover all necessary material required for the 8<sup>th</sup> Grade MCA III Test. Course content includes arithmetic computations, solving single-variable equations, graphing linear equations, solving and graphing linear inequalities, systems of equations, exponential functions, quadratic functions, as well as numerous connections to geometry. Throughout the course, students will master techniques for efficiently solving word problems.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of a whiteboard, hands-on discovery learning, class participation, student board work and real-life application projects. Assessments include daily homework, weekly quizzes and chapter tests.



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Schoology is maintained giving students access to daily assignments, as well as quiz and test dates.

**Basis for Student Success:** Ability to simplify using order of operations, combining like terms, compute and simplify real number calculations (integers, decimals, and fractions), and solve basic single-variable equations.

**Minnesota State Standards:** Three main strands are addressed. Algebra strand focuses on understanding, recognizing, representing, solving and explaining functions in real-world and mathematical situations. Geometry & Measurement strand focuses on solving distance, midpoint, and Pythagorean theorem examples using algebra. Data Analysis & Probability strand focuses on displaying and analyzing data, as well as simple and compound probability.

## Geometry with Stats

**Course#:** A-S1 (0212) B-S2 (0213) – Full Year Course

**Grade Level:** 9 - 12

**Prerequisite:** Algebra X or Algebra; Teacher Recommendation.

**Course Description:** This course encompasses Geometry, Statistics and Probability. Algebra skills are strongly reinforced throughout the year. This course includes many of the same topics that are covered in Geometry X, but with an emphasis on application and a minimal amount of theory. Additionally, this course also covers statistics and probability, satisfying the statistics graduation requirement. **This course is by teacher recommendation only.**

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects, coursework on Schoology, and individual or small group hands-on activities. Assessments include daily homework, quizzes, chapter tests and semester final exams. A course website is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** This course prepares students for both the 11<sup>th</sup> grade MCA III exam as well as Algebra II. Students are expected to be proficient in their basic number operations and basic algebra as these are necessary skills for success in this course.

## Geometry X

**Course #:** A-S1 (0214) B-S2 (0215) – Full Year Course

**Grade Level:** 8 - 12

**Prerequisite:** Students must have obtained a C- or better in second semester of Algebra X or Algebra; Teacher Recommendation

**Course Description:** Geometry is a course designed for those students who plan to continue in a college bound math track. It aims to develop powers of spatial visualization, gain a basic understanding of coordinate Geometry and thus recognize the way in which Algebra and Geometry complement each other and understand the role of inductive and deductive reasoning (proofs) in both mathematical and non mathematical situations. Topics include: Reasoning and proof;



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characteristics and properties of lines and angles, perpendicular and parallel lines, congruent and similar triangles, right triangles, quadrilaterals, polygons, and circles; right triangle trigonometry; surface area and volume of solid; transformations.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects and individual or small group hands-on activities. Assessments include daily homework, weekly quizzes, chapter tests, projects, and semester final exams. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** Strong algebra skills, including, but not limited to: ability to solve multi-step equations, writing equations of lines, evaluating and simplifying radical expressions. It is recommended that students have received a C- or higher in Algebra X to enroll in the course.

**Minnesota State Standards:** All standards are addressed within the Geometry & Measurement Strand in the Minnesota State Standards, as well as many other Strands being readdressed and strengthened.

## Algebra II

**Course #: A-S1 (0218) B-S2 (0219) - Full Year Course**

**Grade Level: 9 - 12**

**Prerequisite: Geometry X or Geometry with Stats; Teacher Recommendation.**

**Course Description:** This course will expose students to standard and advanced algebra concepts. Some of the standard concepts presented are solving/writing linear equations, graphing linear functions, function notation, solving inequalities, factoring, and solving systems of equations/inequalities. More advanced algebraic topics include solving, graphing, and writing of quadratic, absolute value, and other polynomial functions. Properties and scenarios involving roots, powers, and radicals will also be included. Exponential growth/decay, logarithms, and rational functions (solve, graph and simplify rational equations and functions and determine extraneous solutions), and working with complex solutions while using all operations in simplifying complex numbers will make up the remainder of these advanced topics.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work and real-life application projects. Assessments include daily homework, weekly quizzes and chapter tests and coursework on Schoology. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** Ability to simplify using order of operations, solve basic linear equations and graph linear functions. Graphing calculators are strongly encouraged (TI-83+ or above recommended).

**Minnesota State Standards:** Three main strands are addressed. Algebra strand focuses on understanding, recognizing, representing, solving and explaining functions in real-world and mathematical situations. Evaluate radical and polynomial expressions. Geometry & Measurement



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strand focuses on solving real-world geometry problems using algebra. Data Analysis & Probability strand focuses on displaying and analyzing data.

## Algebra II X

**Course #:** A-S1 (0220) B-S2 (0221) - Full Year Course

**Grade Level:** 8 - 12

**Prerequisite:** Students must have obtained a C- or better in second semester of Geometry X or Algebra II. \*Note \* - this course may be taken in conjunction with Geometry X, but all students must pass Algebra I X as a prerequisite.

**Course Description:** This course will expose students to the standard concepts of algebra along with more detailed topics related to algebra. Some of the standard concepts presented are solving/writing linear equations, graphing linear functions, function notation, solving inequalities, factoring, and solving systems of equations/inequalities. More advanced algebraic topics include solving, graphing, and writing of quadratic functions and other polynomial functions. Properties and scenarios involving roots, powers, and radicals will also be included. Exponential growth/decay, logarithms, rational functions and conic sections will make up the remainder of these advanced topics. In addition, students will be exposed to numerous real-life applications within all of these topics described.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and standard whiteboard, class participation, student board work, and individual or small group hands-on activities. Assessments include daily homework (typically collected daily or weekly depending on the teacher), homework quizzes, coursework on Schoology, weekly quizzes/tests and semester final exams.

**Basis for Student Success:** Strong algebra skills, proficiency in algebra I X such as solving all types of equations and the use of a calculator are important. Graphing calculators are required (TI-83+ or above recommended).

**Minnesota State Standards:** Three main strands are addressed. These include portions of strand I, Mathematical Reasoning, strand II Number Sense, Computation, and Operations, and strand III Patterns, Functions, and Algebra.

## FST Function, Statistics, and Trigonometry

**Course#:** A-S1 (0222) B-S2 (0223) – Full Year Course

**Grade Level:** 9 - 12

**Prerequisite:** C- or better in second semester of Algebra II X.

**This course may be bypassed if a student meets the necessary requirements set in Algebra IIX; however, a statistics credit must still be earned by taking either General Statistics or Online AP Statistics.**

**Course Description:** This course will expose students to mathematical and real-life applications of advanced algebra 2X, precalculus, statistical and probability concepts. Advanced algebra 2X concepts address the application and transformations of linear, quadratic, exponential, logarithmic ,





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conic and polynomial functions and models. Precalculus concepts address the application and graphs of circular and trigonometric functions and the application of sequences and series. Statistical concepts address statistical analysis and display of data and its transformations. Probability concepts address probability methods and distributions, counting methods and normal distributions of data.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects and individual or small group hands-on activities. Assessments include daily homework, weekly quizzes, coursework on Schoology, chapter tests and semester final exams. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** Strong algebra skills, proficiency in Algebra 2X such as solving all types of equations and the use of a graphing calculator are important. Graphing calculators are required (TI-83+ or above recommended).

**Minnesota State Standards:** Three main strands are addressed in FST. Algebra strand focuses on understanding, recognizing, representing, solving and explaining functions in real-world and mathematical situations. Geometry & Measurement strand focuses on proving theorems and solving geometric problems. Data Analysis & Probability strand focuses on displaying and analyzing data, making predictions and conclusions with data, and calculating probabilities.

## Pre-Calculus

**Course#:** A-S1 (0224) B-S2 (0225) - Full Year Course

**Grade Level:** 9 - 12

**Prerequisite:** C- or better in second semester of FST

**Students who earn a 90% or higher on their second semester test scores and a 90% or higher on their final exam in Algebra IIX will have the option to enroll in Pre-Calculus.**

**Students enrolled in Algebra IIX who do not meet both criteria, but wish to enroll in Pre-Calculus, must make formal application with their teacher and guidance counselor before acceptance is approved into Pre-Calculus.**

**Course Description:** This course covers a range of advanced math topics including trigonometry (both a circular and noncircular approach), functions and their inverses, exponents, logarithms, advanced graphing, and some probability and statistics. An introduction to some calculus topics including limits, summation, and partial fractions is also a part of this course. This course is ideal for students who expect to take A.P. Calculus in high school, or Calculus I in college next year.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects and individual or small group hands-on activities. Assessments include daily homework, quizzes, coursework on Schoology, chapter tests and semester final exams. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.



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**Basis for Student Success:** Strong algebra skills, proficiency in Algebra 2X such as solving all types of equations and the use of a graphing calculator are important. Graphing calculators are required (TI-83+ or above recommended).

## Online General Statistics

**Course#: 0226 – Semester Course**

**Grade Level: 10 - 12**

**Prerequisite: Algebra X/Algebra**

**Course Description:** This course is a semester long class encompassing both statistics and probability. The course topics are chosen to enhance the student's performance on the MCA and ACT tests as well as to fulfill the high school graduation requirement. This course is designed for all students who wish to attend a two or four year university, in addition to those wishing to major in an area which emphasizes statistics. Specific topics include gathering, analyzing, and displaying data, formulating a hypothesis, random variables, sampling distributions, probability spaces, and enumerative Combinatorics (factorial notation, permutations, conditional permutations, and combinations).

**Instructional Methods and Assessments:** The primary instructional method will be teacher created videos that are aligned directly with learning targets and topics listed above. Formative assessments will include daily homework, application activities, and discussion posts completed on Schoology. Summative assessments will include projects and chapter tests that will be completed by hand and submitted in person. Schoology is maintained giving students access to daily assignments, as well as quiz and test dates.

**Basis for Student Success:** Ability to solve single-variable equations, and be familiar with simple and compound probability.

**Minnesota State Standards:** Data Analysis & Probability strand focuses on displaying and analyzing data, computing simple and compound probability, as well as using enumerative Combinatorics to compute outcome values.

## Applied Mathematics

**Course#: A-S1 (0216) B-S2 (0217) - Full Year Course**

**Grade Level: 12**

**Prerequisite: Successful completion of Algebra II or Algebra IIX**

**Course Description:**

This is a year long course which will expand and dig deeper into topics previously explored in the student's mathematical career, but with a more applied approach to everyday life. Applied Mathematics will prepare students for success in college and their careers as well as their real lives in the 21st Century. Units of study will include Applications of Linear and Quadratic Functions, various aspects of Personal Finance, and applications of Probability and Statistics. **Completion of the full year of this course will satisfy the statistics requirement for graduation.**





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**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard, hands-on discovery learning, class participation, student board work, coursework on Schoology, and real-life application projects. Assessments include daily homework, weekly quizzes, chapter tests and hands-on projects, but there will be a heavier focus on project based learning. Schoology is maintained giving students access to daily assignments as well as quiz and test dates.

**Basis for Student Success:** Ability to apply mathematical concepts from Algebra I, Geometry, and Algebra II to real world scenarios in a project based learning environment.

## A.P. Calculus - AB

**Course#:** AB A-S1 (0227) B-S2 (0228) – Full Year Course

**Grade Level:** 10 – 12

**Prerequisite:** Pre-Calculus

**Course Description:** Advanced Placement Calculus is a course designed for those students who have successfully completed Precalculus by the end of their junior year. The course follows the Advanced Placement (A.P.) guidelines for Calculus AB. Topics covered are: Limits and continuity, derivatives and integrals and their applications, plus some analytic Geometry. College credit may be earned upon successful completion of the AP exam in May.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects and individual or small group hands-on activities. Assessments include daily homework, quizzes, coursework on Schoology, chapter tests and semester final exams. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** Strong algebra skills, proficiency in Pre-Calculus such as solving all types of equations and the use of a graphing calculator are important. Graphing calculators are required (TI-83+ or above recommended).

## A.P. Calculus - BC

**Course#:** BC A-S1 (0200) B-S2(0201) – Full Year Course

**Grade Level:** 11 – 12

**Prerequisite:** Calculus AB or Teacher Recommendation

**Course Description:** Advanced Placement Calculus is a course designed for those students who have successfully completed Calculus AB by the end of their junior year. The course follows the Advanced Placement (A.P.) guidelines for Calculus BC. Topics covered are those addressed in college level Calculus II. College credit may be earned upon successful completion of the AP exam in May.

**Instructional Methods and Assessments:** Instructional methods include lecture via the use of an interactive whiteboard and student response clickers, class participation, student board work, small chapter projects and individual or small group hands-on activities. Assessments include daily



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homework ,quizzes, coursework on Schoology, chapter tests and semester final exams. Schoology is maintained giving students access to daily assignment notes, quiz and test dates and teacher availability.

**Basis for Student Success:** Strong algebra skills, proficiency in Calculus AB, Pre-Calculus such as solving all types of equations and the use of a graphing calculator are important. Graphing calculators are required (TI-83+ or above recommended).

## Online A.P. Statistics

**Course#:** A-S1 (0229) B-S2 (0230) – Full Year Course

**Grade Level:** 10 - 12

**Prerequisite:** Can be taken in conjunction with any course beyond Algebra 2X.

**Course Description:** This course provides an in-depth study of descriptive and inferential statistics including probability and sampling methods. Topics are presented and assessed as they would be in a college statistics course. College credit may be earned upon successful completion of the A.P. exam in May. Course will be offered during zero hour. Students will do course learning and formative assessments online independently while maintaining the required pace for learning. Summative assessments will be administered by the teacher during school hours or in the afterschool testing room per the course pacing.

**Instructional Methods and Assessments:** All instructional methods are online and comprised of watching and listening to teacher led recorded videos for note taking (or Other Educational Resources (OERs) from Khan Academy, YouTube, etc.), doing activities or online simulations and applets, and reading brief articles. Students will be highly encouraged to do the designated chapter reviews. Formative assessments include online chapter applets, multiple choice questions, free response analyses and write ups, and section quizzes. Summative assessments include paper-based multiple choice and free response chapter tests, a final exam and final project. Online formative assessments are used to aide students in their learning; therefore, can be retaken up to 3 times. Paper-based summative assessments are used in this course to help simulate the actual AP testing environment and are retakeable one time if not scheduled during the last week of each quarter. A Schoology course website is used to deliver the course learning; thereby, allowing students to work independently while staying on pace. Students are required to meet quarterly pacing deadlines. The course is also designed to offer teacher support and availability during zero hour.

**Basis for Student Success:** Self-driven, independent student with the ability to manage oneself and keep ON PACE with course learning targets. Strong Algebra skills including solving all types of equations, strong data analysis skills, and being able to use a graphing calculator. Graphing calculators are required (TI-83+ or above recommended).

