# Pre-AP Precalculus
**G. W. Brackenridge High School**

<table>
<thead>
<tr>
<th><strong>Priya Jagadeeswaran</strong></th>
<th>(Please call me Ms. Jag)</th>
<th><strong>TBA as needed</strong></th>
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<tbody>
<tr>
<td><strong>Room</strong></td>
<td>265 (Cold Wing)</td>
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<tr>
<td><strong>Email</strong></td>
<td><strong><a href="mailto:PJagadeeswaran1@saisd.net">PJagadeeswaran1@saisd.net</a></strong></td>
<td><strong>MsJagsClassroom.com</strong></td>
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<tr>
<td><strong>Website</strong></td>
<td>Class Notebook</td>
<td>(resources posted here)</td>
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**Office Hours** *with the exclusion of meetings which are typically on Wednesdays*  
**Morning**  
Monday through Friday: 8am – 8:45am  
**Afternoon**  
Tuesday – Thursday by appointment

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**The Pre-AP Precalculus course** extends and integrates concepts from Algebra and Geometry. Students use functions, equations, and limits as useful tools for expressing generalizations and as means for analyzing and understanding a broad variety of mathematical relationships. The foundations of this course are functions such as polynomial (linear, quadratic, square root), exponential, logarithmic, rational, and trigonometric, as well as conic sections, inverse and second degree relations and their graphs, complex numbers, polar coordinates, vectors and sequence & series. This course also introduces and extends on concepts from Trigonometry, Calculus, and Statistics. Students will study trigonometric relationships and identities, trigonometric functions, trigonometric graphs, trigonometric special values, probabilities, limits, and derivatives. They will utilize these concepts to solve a complex mathematical constructs with real world applications and relate these to higher mathematics. There is an emphasis on verification of trigonometric identities using all of the basic trigonometric identities as well as an understanding of the unit circle and its effect on the world around us. Students will use graphing calculators in activities that are appropriate to the topics being studied and recognize the applications of calculator usage in advanced mathematics.

**Supplies to bring EVERYDAY:**
1. Writing Implement  
2. Cell Phone (if student doesn’t have cell phone there are laptops available in class)  
3. AN OPEN MIND AND A POSITIVE ATTITUDE!

**The FLIPPED CLASSROOM:**
My classroom is a flipped classroom; a flipped classroom is a learning environment where Studentss do their “learning” at home, but do their “homework” in class. In essence, your responsibility is to do “prework” for the lesson at home, then in class, you would apply the work and have the opportunity to practice the concepts in a classroom setting. Flipped classrooms are especially helpful in subjects like mathematics because application is the most important step for retention. A big question I always get is “Why digitize the classroom and what about Studentss who don’t have access to technology?”. Did you know that 1 in 4 students in college are taking online courses? This doesn’t mean 1 in 4 students is a fully online student, it means they are simply taking at least one course online. Blended learning is a very big part of our future. And having 25% (and growing!) of the nation currently taking online courses means that this is too big of a statistic to ignore. So, not only does the digital classroom give you the chance to learn at your own pace, be responsible for your time and your absences, allow you to learn the lessons even if you miss a class, and reinforce learning through the flipped approach. It also develops Studentss and prepares them for the rigors and fears of the real world. It prepares you with time management, it helps develop your prioritization skills, and it creates and environment that stresses social collaboration. These are all real world skills that graduating high school students need in today’s environment; and these skills aren’t just necessary to succeed in the ever changing and ever developing world that is higher education. These are the skills you need to jump into the work force, to go to technical schools, to join the military and so much more. So why choose a digital, flipped classroom? To help you become a better you and give you your best shot at success, whatever your definition of success is!

**Grading Policy:**
SAISD standards dictate that:

<table>
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<tr>
<th>Your Nine Weeks grade will be:</th>
<th>Your Semester grade will be:</th>
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<tbody>
<tr>
<td>60% - Assignments</td>
<td>85% - Average of the 2 Nine Weeks</td>
</tr>
<tr>
<td>40% - Assessments</td>
<td>15% - Semester Exam</td>
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**Assignments:**
This includes prework assignments, entrance tickets, class activities, forum discussions, and exit tickets. These may be graded and, when returned or completed, should be digitized into your Student Notebook until the end of the year. You are responsible for checking the Class Notebook, completing assignments, and updating your Student Notebook. You must show all work for credit, whether you choose to use fully digital technology or you choose to use paper and digitize it later.
Class Forum:
In order for a flipped classroom to work effectively, students should feel they have access to answers when they are learning. For this reason, I require my students to participate in the class forum. This is a professional collaborative space; keep your responses respectful and helpful. At any point in your learning you can open the Class Notebook and go to the forum where students are posting questions. Please feel free to post your questions, answer others, or simply read through the issues that students are facing in the course. I will be monitoring the collaboration space and answering questions as needed, but I rely on you, Students, to help your classmates understand. Learning is done best in collaboration! I hope every one of you has the opportunity to be stumped and have another classmate help them through their confusion, and remember, when we teach others, we learn more the concept better for ourselves!

Assessments:
Quizzes occur often and randomly throughout the year. These quizzes are designed to develop, advance, and test your rote memorization skills. To better prepare for these quizzes, review Algebra and Geometry concepts. Tests will occur at the end of a unit section, check your calendar often and check for updates. You will always be reminded on the Class Team and you will always receive a test review, digital or in class as needed.

Absences: **GOOD ATTENDANCE IS ESSENTIAL FOR SUCCESS!**
SAISD and the State of Texas require 90% attendance to receive credit. But beyond this, excused absences in my class, especially with advance notice, will be required to complete the assignment within 48 hours of the absence and turned in digitally for 100% credit; for unexcused absences, Students will have 24 hours to complete and return digitally for 80% credit. Math, like all learning, should be applied consistently to see results. Spotty attendance hurts your chances for success in this course. Missed Assessments MUST be made up within 5 days of the original test date otherwise it will be a locked in ZERO.

Class Technology Rules:
Cell phones are used in class for assignments and activities daily. Students will be informed of correct times for usage. All other times, students should follow Brackenridge policy and keep their phones silent, dark, and put away. For all other technology in class, be respectful and remember that other students will be using them and sharing.

General Classroom Rules and Norms:
1. Check your apps daily!
2. Bring an open mind and a willingness to try every day. Math can be frustrating, I understand that. Try to come in with a positive intention and the work becomes easier as you ask questions and collaborate with your classmates and teacher.
3. Bring a writing implement and cell phone if you can. Be on time. Stay on task. Help keep the room clean and neat. Do not leave garbage. Follow school and classroom policy on cellphones. Be courteous, considerate and respectful to others. Do not interfere with the learning of others.
4. BELIEVE you can do math! I believe in you and there is no such thing as a math brain or a math gene. I expect all students to achieve at high levels.
5. Embrace mistakes! MISTAKES ARE VALUABLE! Research shows that each time you make a mistake your brain grows. Failure and struggle does not mean you cannot do math – these are the most important parts of math and learning.
6. Depth is much more important than speed. Top mathematicians think slowly and deeply.
7. Questions are really important. Always ask questions, always answer questions. Ask yourself; why does that make sense?
8. Math is about creativity and making sense. Math is a very creative subject that is at its core about visualizing patterns and creating solution paths that others can see, discuss, and critique.
9. Math is about connections and communicating. Math is a connected subject, and a form of communication. Represent math in different forms such as words, a picture, a graph, an equation and then link them. Color code!
10. Math Class is about learning, not performing. Math is a growth subject; it takes time to learn, and it is all about effort.

Please fill out this Intake Form as proof of reading and understanding this syllabus. This intake form is not scary. Please double check your information is correct so that if I need to contact you there are no mistakes. Contacts throughout the year can happen for a number of reasons: important announcements about class or opportunities, positive feedback, intervention feedback, and so much more.

Scan this QR code:

OR

Go to this website:
shorturl.at/auADQ
Students use logical problem solving and critical thinking skills to determine and analyze adult appropriate behaviors and skill sets that would prepare students for life post-graduation. Students describe and evaluate processes that they can apply throughout the school year and connect these with life post-graduation.

Students are expected to evaluate and perform mathematical solves from previous years of study, to include but not limited to, 6th grade math, 7th grade math, Pre-Algebra, Algebra, and Geometry.

### Unit 1: Foundations of Functions

Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to use the composition of two functions to model and solve real-world problems; demonstrate that function composition is not always commutative; represent a given function as a composite function of two or more functions; describe symmetry of graphs of even and odd functions; and determine an inverse function, when it exists, for a given function over its domain or a subset of its domain and represent the inverse using multiple representations.

### Unit 2: Polynomial Functions

Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to graph polynomial, power, and piecewise defined functions, including step functions; graph functions, including polynomial and power functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems; determine and analyze the key features of polynomial, power, and piecewise defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing; analyze and describe end behavior of functions, including polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems; and analyze situations modeled by functions, including polynomial, and power functions, to solve real-world problems.

Students use process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. Students are expected to solve polynomial equations with real coefficients by applying a variety of techniques in mathematical and real-world problems; and solve polynomial inequalities with real coefficients by applying a variety of techniques and write the solution set of the polynomial inequality in interval notation in mathematical and real-world problems.

### Unit 3: Rational Functions

Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to graph rational functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems; determine and analyze the key features of rational functions, such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing; analyze and describe end behavior of rational functions, using infinity notation to communicate this characteristic in mathematical and real-world problems; and determine various types of discontinuities in the interval (-∞, ∞) as they relate to functions and explore the limitations of the graphing calculator as it relates to the behavior of the function around discontinuities; and describe the left-sided behavior and the right-sided behavior of the graph of a rational function around discontinuities; analyze situations modeled by rational functions to solve real-world problems.

Students use process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. Students are expected to solve rational inequalities with real coefficients by applying a variety of techniques and write the solution set of the rational inequality in interval notation in mathematical and real-world problems.

### Unit 4: Exponential Functions

Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to determine an inverse function, when it exists, for a given function over its domain or a subset of its domain and represent the inverse using multiple representations; graph exponential and logarithmic functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems; determine and analyze the key features of exponential and logarithmic functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing; analyze and describe end behavior of exponential and logarithmic functions using infinity notation to communicate this characteristic in mathematical and real-world problems; and analyze situations modeled by exponential and logarithmic functions to solve real-world problems.

Students use process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. Students are expected to use the properties of logarithms to evaluate or transform logarithmic expressions; generate and solve logarithmic equations in mathematical and real-world problems; and generate and solve exponential equations in mathematical and real-world problems.

### Unit 5: Sequences & Series and Binomial Expansion

Students use process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. Students are expected to evaluate finite sums and geometric series, when possible, written in sigma notation; represent arithmetic sequences and geometric sequences using recursive formulas; calculate the nth term and the nth partial sum of an arithmetic series in mathematical and real-world problems; represent arithmetic series and geometric series using sigma notation; calculate the nth term of a geometric series, the nth partial sum of a geometric series, and sum of an infinite geometric series when it exists; and apply the Binomial Theorem for the expansion of $(a + b)^n$ in powers of $a$ and $b$ for a positive integer $n$, where $a$ and $b$ are any numbers.

### Unit 6: Parametric Functions

Students use the process standards in mathematics to model and make connections between algebraic and geometric relations. Students are expected to graph a set of parametric equations; convert parametric equations into rectangular relations and convert rectangular relations into parametric equations; and use parametric equations to model and solve mathematical and real-world problems.

### Unit 7: Polar Functions

Students use the process standards in mathematics to model and make connections between algebraic and geometric relations. Students are expected to graph points in the polar coordinate system and convert between rectangular coordinates and polar coordinates; and graph polar equations by plotting points and using technology.

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**SEMESTER REVIEW & EXAMS: Cumulative Exam covering Units 1-7**
<table>
<thead>
<tr>
<th>Unit 8</th>
<th>Trigonometric Ratios and The Unit Circle</th>
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<tbody>
<tr>
<td>Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems.</td>
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9 Days

4/12/19 – 2/1/19

<table>
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<tr>
<th>Unit 9</th>
<th>Trigonometric Functions</th>
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<tbody>
<tr>
<td>Students use process standards in mathematics to explore, describe, and analyze the attributes of functions. Students make connections between multiple representations of functions and algebraically constructs new functions. Students analyze and use functions to model real-world problems. Students are expected to graph trigonometric and inverse trigonometric functions; graph trigonometric and inverse trigonometric functions and their transformations, including af(x), f(x) + d, f(x - c), f(bx) for specific values of a, b, c, and d, in mathematical and real-world problems; determine and analyze the key features of trigonometric and inverse trigonometric functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing; develop and use a sinusoidal function that models a situation in mathematical and real-world problems; determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems.</td>
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6 Days

2/4/19 – 2/20/19

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<tr>
<th>Unit 10</th>
<th>Trigonometric Equations</th>
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<tr>
<td>Students use process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. Students are expected to use trigonometric identities such as reciprocal, quotient, Pythagorean, cofunctions, even/odd, and sum and difference identities for cosine and sine to simplify trigonometric expressions; and generate and solve trigonometric equations in mathematical and real-world problems.</td>
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6 Days

2/21/19 – 3/8/19

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<tr>
<th>Unit 11</th>
<th>Conics</th>
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<tr>
<td>Students use the process standards in mathematics to model and make connections between algebraic and geometric relations. Students are expected to determine the conic section formed when a plane intersects a double-napped cone; make connections between the locus definition of conic sections and their equations in rectangular coordinates; use the characteristics of an ellipse to write the equation of an ellipse with center (h, k); and use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k).</td>
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10 Days

3/18/19 – 4/12/19

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<tr>
<th>Unit 12</th>
<th>Vectors</th>
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<tr>
<td>Students use process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. Students are expected to represent angles in radians or degrees based on the concept of rotation in mathematical and real-world problems, including linear and angular velocity; determine the value of trigonometric ratios of angles and solve problems involving trigonometric ratios in mathematical and real-world problems; use trigonometry in mathematical and real-world problems, including directional bearing; use the Law of Sines in mathematical and real-world problems; use the Law of Cosines in mathematical and real-world problems; use vectors to model situations involving magnitude and direction; represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically; and apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems.</td>
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9 Days

4/15/19 – 5/10/19

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<tr>
<th>Unit 13</th>
<th>Introduction to Calculus</th>
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<td>Students use the process standards in mathematics to explore, describe, and analyze the introductory attributes of Calculus. Students analyze and use Calculus to model real-world problems. Students are expected to represent limits with correct notation and connect with end behavior; determine limits graphically; determine limits algebraically using techniques including but not limited to, direct substitution, factoring, asymptotes and discontinuities, conjugates, rational functions, indeterminate forms, trigonometric identities, and approximation; apply technology to understand and analyze limits; use limits in real-world problems; determine tangent lines and discern tangent lines from secant lines; connect tangent lines to Calculus concepts; determine the rate of change and make connections to velocity in real-world models; define and analyze the formal definition of a derivative; use the definition of a derivative to prove the derivatives of polynomials; analyze the derivatives of polynomials using the Power Rule; define and analyze the anti-derivative; use the anti-derivative to determine area under the curve using real-world problems.</td>
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4/15/19 – 5/10/19

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<tr>
<th>Unit 14</th>
<th>Introduction to Statistics</th>
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<tr>
<td>Students use the process standards in mathematics to explore, describe, and analyze the introductory attributes of Statistics. Students analyze and use Statistics to model real-world problems. Students are expected to analyze data for one-variable data sets; become familiar with graphical portrayal of data using box and whisker plots, stem pots, and histograms; create graphical displays for one variable data and analyze key features, such as shape, center, spread, as well as any unusual features; become familiar with descriptive statistics such as the five-number summary, median, media, variance, and standard deviation; analyze graphical and numerical one-variable data sets with real-world models; define and learn about discrete random variables and their probability distributions; explore properties of the normal distribution; use tables of the normal distribution; apply the normal distribution as a model for measurement; define, analyze, and apply the Central Limit Theorem in real-world models; and determine and define confidence intervals and margin of error.</td>
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9 Days

4/15/19 – 5/10/19

**FINAL REVIEW & EXAMS:** Semi-Cumulative Exam covering Units 8-14