Huntsville City Schools
2017 – 2018 Pacing Guide
Precalculus and Precalculus Honors

Math Practices:

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Elaboration on each standard: www.corestandards.org/Math/Practice/
Kid friendly language: www.buncombe.k12.nc.us/Page/37507

Online Resources:

- Dan Meyer's Ted Talk about teaching math: https://youtu.be/qocAoN4jNwc
- Links to Dan Meyer's 3-act activities, sorted by standard: https://docs.google.com/spreadsheet/ccc?key=0AjIqyKM9d7ZYdEhtR3BJMmdBWnM2YWxWYVM1UWowTEE#gid=0
- Granite City Math Vocabulary: http://www.graniteschools.org/mathvocabulary/
- Open Curriculum - activities from all over the internet sorted by standard: www.opencurriculum.org
- MARS - Mathematics Assessment Resource Service – formative assessments and group activities: http://map.mathshell.org/lessons.php
- Desmos – free online calculator – excellent for working with linear equations, scatterplots, and best-fit lines : www.desmos.com Teacher version includes lessons and activities: https://teacher.desmos.com/
- Geogebra – free online geometry tool www.geogebra.org
- Statistics resources and other resources are located in the district Precalculus Resources folder

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First Nine Weeks

Important Notes:

1. *Common Core objectives are given by number*
2. *The number of days listed are approximate and are padded to allow a little extra time for review and tests*
3. *Students will be allowed to use graphing calculators on all exams for PreCalculus*

The Textbook for this course is: PreCalculus 4th edition, Blitzer

Standard	Resources	Approximate Pacing Number of Days 21
There are 3 days extra days for regular and 0 extra days for Honors. **The extra days can be used for LTF lessons, or extra time on a difficult section. The extra time is also built in for assemblies, weather, testing, ectara.**		
		1 day of introduction
	Test 1	**7 Days**
16. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. (*Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. Determine odd, even, neither.)* * [F-IF4]	Sections: 1.1 - Graphs and Graphing Utilities • Only introduce how to use the graphing calculator to graph functions and table of values, show how to find the x and y intercepts • Use problems Page 143 #13-28, 41-46 1.2 - Basics of Functions and Their Graphs • Review function notation, zeros, y-intercept, interval notation {using domain and range} • Use problems Page 159 #27-38, 65-90	**1 day on 1.1 & 1.2** **1 day on 1.3** **1 day mid-chapter assessment** **1 day on 1.10** **1 day on 1.6** **1 day review** **1 day test**
16. For a function that models a relationship between two quantities, interpret key features of graphs and	1.3 - More on Functions and Their Graphs • Increase/decrease, max/min, even/odd, symmetric with x-axis, y-axis, and/or origin	

tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. (*Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. Determine odd, even, neither.)* * [F-IF4] 18a. Graph functions expressed symbolically, and show key features of the graph, by hand in simple cases and using technology for more complicated cases. * [F-IF7] a. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. [F-IF7b] *(Focus on using key features to guide selection of appropriate type of model function with emphasis on piecewise, step, and absolute value. Also emphasize inverse and transformations of polynomials, rational, radical, absolute value, and trigonometric functions.)* **Honors:** Evaluate the difference quotient of a function 1.3 page 175 #55-76	• Use problems Page 172 #1-54 LTF Lessons: ❖ Characteristics of Functions ❖ Describing Graphs ❖ Even/Odd Functions ❖ Applying Piecewise Functions ❖ Piecewise Puzzle FAL (Formative Assessment Lesson): Recognizing Trigonometric Functions	

16. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. (*Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. Determine odd, even, neither.)** [F-IF4]	1.10 – Modeling with Functions • Examples 3, 4, & 5 Show how to find maximums & minimums • Use problems Page 262 #15-18, 21-34	
18a. Graph functions expressed symbolically, and show key features of the graph, by hand in simple cases and using technology for more complicated cases.* [F-IF7] a. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. [F-IF7b] *(Focus on using key features to guide selection of appropriate type of model function with emphasis on piecewise, step, and absolute value. Also emphasize inverse and transformations of polynomials, rational, radical, absolute value, and trigonometric functions.)*	Sections: 1.6 – Transformations of Functions • Show the general transformations of any function and then apply it to polynomials, square root, cube root, & absolute value • Use problems Page 216 # 1-118 LTF Lessons: ❖ Parent Function Charades ❖ Frantic Functions ❖ A Transformation Story ❖ Power and Root Functions – A Look at Concavity	

	Test 2	5 Days
17. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.* [F-IF6]	Sections: 1.4 (Preparing for section 1.5) - Linear Functions and Slope • Review the slope formula, different equations of a line, and rewriting them into slope intercept form • Use problems Page 188 # 1-38, 59-66 1.5 - More on Slope • Average rate of change • Use problems Page 200 # 13-19, 27-32 LTF Lesson: ❖ Calculating the Average Rate of Change	**1 day on 1.4 & 1.5** **1 day on 1.7** **1 day on 1.8** **1 day review** **1 day test**
19. (+) Compose functions. [F-BF1c]	Section: 1.7 – Combinations of functions (and Compositions) • Function composition • Use problems Page 230 # 49-72	
20. Determine the inverse of a function and a relation. [AL] 21. (+) Verify by composition that one function is the inverse of another. [F-BF4b] 22. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. [F-BF4c] 23. (+) Produce an invertible function from a non-invertible function by restricting the domain. [F-BF4d]	Section: 1.8 – Inverse functions • Determine the inverse of a function and a relation. Verify by composition that one function is the inverse of another. Read values of an inverse function from a graph or a table, given that the function has an inverse. Produce an invertible function from a non-invertible function by restricting the domain. • Use problems Page 240 #1-64, 69	

Polynomial & Rational Functions:	**Test 3**	**5 Days**
2. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. [N-CN5]	Section: 2.1 – Complex Numbers – basic operations • Represent addition, subtraction, multiplication, and conjugation of complex numbers • Use problems Page 284 #1-44, 61-62	**1 day on 2.1** **1 day on 2.3** **1 day on 2.6** **1 day review** **1 day test**
18b. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. [F-IF7c]	Sections: 2.3 – Polynomial Functions and Their Graphs • Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior • Use problems Page 312 # 15-32, 41-54 LTF Lesson: ❖ Investigating Functions	
18c. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. [F-IF7d]	Section: 2.6 – Rational Functions and Their Graphs LTF Lessons: ❖ Rational Functions and their Asymptotes ❖ Piecewise and Rational Functions	

Matrices:	**Honors Test 4** **This will be moved to 4th 9-weeks for regular**	**3 Days**
14. (+) Represent a system of linear equations as a single matrix equation in a vector variable. [A-REI8]	Section: 8.1 – Matrix Solutions to Linear Systems • Write the augmented matrix for a system of equations. • Use problems p 814 #1 – 12 • **Honors:** Solving a system using Gaussian Elimination, Gauss-Jordan Elimination, or technology. Use problems p815 #21-38	**.5 day on 8.1** **1 days on 8.2** **.5 day review** **1 day test**
10. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors. [N-VM11] **Honors:** 11. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area. [N-VM12]	Section 8.3 – Matrix Operations and Their Applications • Ex 5, 6, 7, 9 • Use problems p839 #27-36 #53-60 • **Honors:** Example 9 with extension to area Use problems p840 #53-60	

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Second Nine Weeks

Standard	Resources	Approximate Pacing Number of Days 19
There is 1 day built in for review for the midterm There is 1 extra day built in. Two Exam days are already accounted for. The extra day can be used for LTF lessons, midterm review, or extra time on a difficult section. The extra time is also built in for assemblies, weather, testing, ectara.		
Exponential & Logarithmic Functions:	**Test 1**	**6 days**
18d. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. [F-IF7e] 25. Compare effects of parameter changes on graphs of transcendental functions. [AL] (Example: compare the graph of $y=e^{x-2}$ to $y=e^{x}$)	Section: 3.1 – Exponential Functions • Examples 1-5, Table 3.1 • Use problems Page 396-397 #11-46 • Honors: Examples 6 and 7 – Compound Interest ○ Use problems Page	**1 day on 3.1 1 day on 3.2 .5 day on 3.3 1.5 days on 3.4 1 day review 1 day test**
18d. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. [F-IF7e] 24. (+) Understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents. [F-BF5] 25. Compare effects of parameter changes on graphs of transcendental functions. [AL] (Example: compare the graph of $y=e^{x-2}$ to $y=e^{x}$)	Section: 3.2 – Logarithmic Functions • Examples 1-6, 8, 11, Table 3.4 • Use problems Page 410-413 #1-46; 113-116 • Honors: Examples 7 and 10 - Domains of log and ln ○ Use Problems Page LTF Lesson: ❖ Discovering the Natural Log Function	

24. (+) Understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents. [F-BF5]	Sections: 3.3 – (Preparing for section 3.4) Properties of Logarithms • Examples 1-6 • Use problems Page 421-422 #1-70 • Optional: change of base Examples 7 and 8 3.4 – Exponential & Logarithmic Equations • Examples 1-9 • Use problems Page 432-435 #1-36, 49-90, 101-104, 115-118 • Honors: Examples 10 and 11 ○ Use Problems Page LTF Lesson: ❖ Exponential Growth and Decay	
Trigonometry:	**Test 2**	**5 days**
Preparing for standards 29 and 30	Section: 4.1– (Preparing for section 4.2) Angles and Radian Measure • Examples 1-7 • Use Problems Page 473 #13-70 • Honors: Linear and Angular Speed ○ Use problems Page	**1 day on 4.1** **1 days on 4.2** **.5 day on 4.3** **.5 day on 6.1** **1 day Review** **1 day test**
29. (+) Use special triangles to determine geometrically the values of sine, cosine, and tangent for $\frac{\pi}{3}, \frac{\pi}{4}, \frac{\pi}{6},$ and use the unit circle to express the values of sine, cosine, and tangent for $\pi - x, \pi + x,$ and $2\pi - x$ in terms of their values for x, where x is any real number. [F-TF3] 30. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. [F-TF4] 33. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$, and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle. [F-TF8]	Sections: 4.2 – The Unit Circle • Examples 1-7 • Regular: Use Pythagorean identities • Use problems Page 486 #1-70 • Honors: Prove the Pythagorean identity and then use. ○ Use problems Page LTF Lesson: ❖ Intro to Trig Ratios with Special Right Triangles 4.3 – (optional) Right Triangle Trigonometry • If not used, you can gain an extra day by only doing .5 a day on review • Focus on angles of elevation and depression • Examples 1, 2, 6, 7 • Use problems Page 499 #1-8, 53-60	

35. (+) Derive the formula $A = (1/2)ab\sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side. [G-SRT9]	Section: 6.1 – Area of a Triangle Using Sine Formula (Laws of sines and cosines are not required in PreCalculus) • Example 6 • Regular: Use the formula • Use problems Page 652 #33-38 • Honors: Students must derive the formula	
	Test 3	**6 days**

26. Determine the amplitude, period, phase shift, domain, and range of trigonometric functions and their inverses. [AL]
18d. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. [F-IF7e]
	Section:
	4.5 – Graphs of Sine and Cosine Functions
	• Examples 1-7
	• Use problems Page 533 # 1-60
	• Show graphs of all 6 trigonometric functions
	  ○ Students must be able to identify each of the 6 trigonometric functions
	  ○ You do not have to show transformations
	• Honors: Examples 8 and 9 – periodic behavior and applications
	  ○ Use problems Page 533 #61-66, 83-88
	LTF Lesson:
	❖ Window Pane Graphing of Trig Functions
		2 days on 4.5
		1 day on 4.7
		1 day on 4.8
		1 day review
		1 day test

31. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. [F-TF6]	Section: 4.7 – Inverse Trig Functions • Examples 1-5 • Use problems Page 563 #1-30	
32. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context. * [F-TF7]	Section: 4.8 – Applications of Trigonometric Functions • Examples 1-5 • Use problems Page 574 #1-12, 29-36, 41-50 • Honors: Examples 7 and 8; Harmonic Motion LTF Lesson: ❖ Fitting Trig Models to Data	
	❖	

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Third Nine Weeks

Standard	Resources	Approximate Pacing Number of Days 20
There are 2 extra days built in. (1 extra for Honors) **1 day is needed for work keys.** **The extra days can be used for LTF lessons, or extra time on a difficult section. The extra time is also built in for assemblies, weather, testing, ectara.**		
Trigonometric Identities:	**Test 1**	**5 days**
27. Use the sum, difference, and half-angle identities to find the exact value of a trigonometric function. [AL] 34. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent, and use them to solve problems. [F-TF9] **Honors:** 34. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent, and use them to solve problems. [F-TF9]	Section: 5.2 – Sum and Difference Formulas • Examples 1, 2, 4, 5 • Use problems Page 603 # 1-8, 13-32 • Honors: Prove the formulas • Use problems Page 5.3 – Double-Angle and Half-Angle Formulas • Honors: Prove the formulas LTF Lesson: ❖ Investigating Double Argument Trigonometric/Circular Equations	**1 day on 5.2** **2 days on 5.3** **1 day review** **1 day test**
Complex Numbers and Polar Coordinates:	**Test 2**	**6 days or 7 days**
Preparation for standard 1	6.3 – (prepares for 6.5) Polar Coordinates • Examples 1-5 • Use problems p 672 #1-48 • Honors: Examples 6 & 7 ❖ Use problems Page 672 #49-74	**1 day on 6.3** **1 day on 6.4** **1 day on 6.5**

Honors: Sections 6.3 and 6.4 are necessary for BC Calculus only.	6.4 – Graphs of Polar Equations • **Honors:** Example 1-5 (explore graphing using various methods as outlined in text and/or with technology – graph and identify circles, limacons, rose curves, and lemniscates and their equations.) • Use problems p683 #1-34 LTF Lesson: ○ Graphing Polar Equations	**2 days on 6.6** **1 day review** **1 day test**
1. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. [N-CN4] **Honors:** 3. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. [N-CN6]	Section: 6.5 – Complex Numbers in Polar Form; DeMoivre's Theorem • Examples 1 – 4 • Use problems Page 696 #1-36 **Honors: Ex 2 with extension - finding midpoint.**	
Vectors:		
5. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, |**v**|, ||**v**||, v). [N-VM1] 6. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. [N-VM2] 8. (+) Add and subtract vectors. [N-VM4]	Section: 6.6 – Vectors • Examples 1 – 6 • Use problems Page 709 #1-38 • **Honors:** Examples 7 – 9 • Use problems Page 709 #39-52 #65-74 LTF Lessons: ❖ Applications of Vectors Vectors in Geometry	

a. (+) Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. [N-VM4a] b. (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. [N-VM4b] c. (+) Understand vector subtraction **v** – **w** as **v** + (–**w**), where –**w** is the additive inverse of **w**, with the same magnitude as **w** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. [N-VM4c] 9. (+) Multiply a vector by a scalar. [N-VM5] a. (+) Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(*vx*, *vy*) = (*cvx*, *cvy*). [N-VM5a] b. (+) Compute the magnitude of a scalar multiple *c***v** using ‖*c***v**‖ = |*c*|v. Compute the direction of *c***v** knowing that when |*c*|v ≠ 0, the direction of *c***v** is either along **v** (for *c* > 0) or against **v** (for *c* < 0). [N-VM5b] **Honors:**7. (+) Solve problems involving velocity and other quantities that can be represented by vectors. [N-VM3]		

Conic Sections:	**Test 3**	**6 days**
15. Create graphs of conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations. [AL] a. Formulate equations of conic sections from their determining characteristics [AL] 37. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. [G-GPE3]	Section: 9.1 – The Ellipse • Examples 1 – 4 • Use problems p883 #1-50 • **Honors:** Example 5, Convert to standard form using completing the square • Use problems p884 #51-56 #65-68	
15. Create graphs of conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations. [AL] a. Formulate equations of conic sections from their determining characteristics [AL] 37. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. [G-GPE3]	Section: 9.2 – The Hyperbola • Examples 1 – 5 • Use problems p897 #1-9 p898 #10-42 • **Honors:** Examples 6 & 7 • Use problems p898 #43-50 #61-64	**1 day on 9.1** **1 day on 9.2** **1 day on 9.3** **1 day on 9.5** **1 day review** **1 day test**
15. Create graphs of conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations. [AL] a. Formulate equations of conic sections from their determining characteristics [AL] 36. (+) Derive the equations of a parabola given a focus and directrix. [G-GPE2]	Section: 9.3 – The Parabola • Examples 1 – 4 • Use problems Page 909 #1-42 • **Honors:** Examples 5 & 6 • Use Problems Page 910 #43-48, 61-68 LTF Lesson: ❖ Planets, Parametric Curves, and Ellipses (Honors Class) ❖ Transformations of Graphs of Conic Sections	
28. Utilize parametric equations by graphing and by converting to rectangular form. a. Solve application-based problems involving parametric equations. [AL]	Section: 9.5 – Parametric Equations	

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Fourth Nine Weeks

Standard	Resources	Approximate Pacing Number of Days 25 (this includes senior finals week)
There is 1 extra day for regular and 0 extra days for Honors **1 day is needed for ACT** **2 days for final review** **2 days for senior finals**		
Matrices:	**Regular Test 1** **Honors has already done this in the 1st 9-weeks**	**3 Days**
14. (+) Represent a system of linear equations as a single matrix equation in a vector variable. [A-REI8]	Section: 8.1 – Matrix Solutions to Linear Systems • Write the augmented matrix for a system of equations. • Use problems p 814 #1 – 12	**.5 day on 8.1** **1 days on 8.2** **.5 day review** **1 day test**
10. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors. [N-VM11]	Section 8.3 – Matrix Operations and Their Applications • Ex 5, 6, 7, 9 • Use problems p839 #27-36 #53-60	
Sequences and Series:	**Regular Test 2** **Honors Test 1**	**6 Days**
12. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.* *(Extend to infinite geometric series.)* [A-SSE4]	Sections: 10.1 – Sequences & Summation Notation (prep 12) • Ex 1, 2, 3, 4, 5, 6 • Use problems p 960 #1- 60 10.2 – Arithmetic Sequences and Series (prep 12 • Ex 1, 2, 4, 5	**1 day on 10.1** **1 day on 10.2** **1 day on 10.3** **1 day on 10.5** **1 day review** **1 day test**

	• Use problems p 969 #1- 50 • **Honors:** Ex 3, 6 • Use problems p 970 #61-71 10.3 – Geometric Sequences and Series (12) • Ex 1, 2, 4, 5, 8 • Use problems pp983 #1-44 #51-56 • **Honors:** Ex 3, 6, 7, 9, 10 • Use problems p983 #45-49 #65-87 LTF Lessons: ❖ Infinite Summing ❖ Getting Serious about Series	
13. (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined, for example, by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.) [A-APR5]	Section: 10.5 – The Binomial Theorem • Ex 1, 2, 3, 4 • Use problems p 1001 #1-46 • **Honors:** Use problems p1001 #47-58	
Limits:	**Regular Test 3** **Honors Test 2**	**4 days or 6 Days**
4. Determine numerically, algebraically, and graphically the limits of functions at specific values and at infinity. [AL] a. Apply limits in problems involving convergence and divergence.	Sections: 11.1 – Finding Limits using Tables and Graphs • Ex 1, 2, 3, 4, 5 (Extension - discuss limits at infinity and asymptotes graphically) (Limits at Infinity Worksheet) • Use problems p1045 #1-54 11.2 – Finding Limits Using Properties of Limits • Ex 1 – 14 • Use problems p1060 #1-50 **Honors:**11.4 – Introduction to Derivatives • Derive the power rule using the limit definition of the derivative. Ex 3 (Note the limit definition of the derivative is used to show the deriving all differentiation techniques – students may use power rule after deriving it from the limit process. Additional	**1 day on 11.1** **1 day on 11.2** **2 days on 11.4** **1 day review** **1 day test**

	differentiation techniques- product, quotient, chain - may be introduced in honors course.) • Find the derivative of a function. Ex 3 • Find the derivative at a point i.e. the slope of the tangent line. Ex 1 • Find the equation of a tangent line. Ex 2 • Use problems p1080 #1-28 LTF Lesson: ❖ Investigating Average Rate of Change ❖ Slopes of Curves ❖ Slopes of Secant Lines and Limits	
Statistics and Probability:	Regular Test 4 Honors Test 3	**6 Days** **5 Days for Honors**
Interpreting Categorical and Quantitative Data: 39. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. *(Focus on increasing rigor using standard deviation.)* [S-ID2] 40. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers*). (Identify uniform, skewed, and normal distributions in a set of data. Determine the quartiles and interquartile range for a set of data.)* [S-ID3] 41. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. [S-ID4] Interpret Linear Models: 42. Compute (using technology) and interpret the correlation coefficient of a linear fit. [S-ID8] 43. Distinguish between correlation and causation. [S-ID9]	Resource material is contained in the district Precalculus Resources Folder Resources 1) TI 84 Activities 2) Lab Based Activities 3) Statistics Resources on MyMathLab: PreCalculus: Graphical, Numerical, Algebraic 9e By Demana Ch. 10 LTF Lesson: ❖ Empirical Rule and Normal Distribution ❖ Linear Regression with Coded Data Another Lesson:	**3 - 4 days of activities** **1 day review** **1 day test**

	Honors Test 4	**4 Days**
<u>Making Inferences and Justifying Conclusions</u>: 44. Understand statistics as a process for making inferences about population parameters based on a random sample from that population. [S-IC1] 45. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. [S-IC2] 46. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. [S-IC3] 47. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. [S-IC4] 48. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. [S-IC5] 49. Evaluate reports based on data. [S-IC6]	Resources (Precalculus Resource Folder) 1) TI 84 Activities 2) Lab Based Activities 3) Statistics Resources on MyMathLab: PreCalculus: Graphical, Numerical, Algebraic 9e By Demana Ch. 10 LTF lessons: ❖ Analyzing Trig Functions ❖ The Jury (probability) ❖ Applying Binomial Expansion to Probabilities ❖ Let's Take a Quiz ❖ How's My Driving? ❖ The Jury ❖ I Want Candy ❖ Take a Sample Please	
<u>Using Probability to Make Decisions:</u> 50. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions. [S-MD1] 51. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. [S-MD2] 52. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. [S-MD3] Example: Find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has		

four choices, and find the expected grade under various grading schemes. 53. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. [S-MD4] Example: Find a current data distribution on the number of television sets per household in the United States, and calculate the expected number of sets per household. How many television sets would you expect to find in 100 randomly selected households? 54. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. [S-MD5]		
Finals Review		**2 days**
Senior Finals		**2 days**

Listed below are the technology standards for grades nine through twelve. You are to make every effort to incorporate the applicable standards into your daily classroom lessons. These standards should be noted in your lesson plans.

Alabama Technology Standards Ninth – Twelfth Grade

Operations and Concepts

Students will:

2. Diagnose hardware and software problems.
   Examples: viruses, error messages
   Applying strategies to correct malfunctioning hardware and software
   Performing routine hardware maintenance
   Describing the importance of antivirus and security software

3. Demonstrate advanced technology skills, including compressing, converting, importing, exporting, and backing up files.
   Transferring data among applications
   Demonstrating digital file transfer
   Examples: attaching, uploading, downloading

4. Utilize advanced features of word processing software, including outlining, tracking changes, hyperlinking, and mail merging.

5. Utilize advanced features of spreadsheet software, including creating charts and graphs, sorting and filtering data, creating formulas, and applying functions.

6. Utilize advanced features of multimedia software, including image, video, and audio editing.

Digital Citizenship

9. Practice ethical and legal use of technology systems and digital content.
   Explaining consequences of illegal and unethical use of technology systems and digital content
   Examples: cyberbullying, plagiarism
   Interpreting copyright laws and policies with regard to ownership and use of digital content
   Citing sources of digital content using a style manual
   Examples: Modern Language Association (MLA), American Psychological Association (APA)

Research and Information Fluency

11. Critique digital content for validity, accuracy, bias, currency, and relevance.

Communication and Collaboration

12. Use digital tools to publish curriculum-related content.
    Examples: Web page authoring software, coding software, wikis, blogs, podcasts

13. Demonstrate collaborative skills using curriculum-related content in digital environments.

Examples: completing assignments online; interacting with experts and peers in a structured, online learning environment

Critical Thinking, Problem Solving, and Decision Making

14. Use digital tools to defend solutions to authentic problems.
    Example: disaggregating data electronically

Creativity and Innovation

1. Create a product that integrates information from multiple software applications.
   Example: pasting spreadsheet-generated charts into a presentation