HONORS PRE-CALCULUS SYLLABUS

2017-2018 Academic School-Year

1st Marking Period – Unit 1

Review Algebra Concepts – 2 Days Review, 1 Day Quiz

Chapter 1: Functions and Their Graphs (Test 1.2 – 1.6)

> 1.2 Functions (NJSLS-A-CED.A.2, NJSLS-A-CED.A.4, NJSLS-F-IF.A.1, NJSLS-F-IF.A.2, NJSLS-F-IF.B.5, NJSLS-F-IF.B.6, NJSLS-F- LE.B.5)

> 1.3 Graphs of Functions (Piecewise & Step Functions) (NJSLS-A-REI.D.10, NJSLS-F-IF.B.4, NJSLS-F-IF.C.7, NJSLS-F-IF.C.7b)

> 1.4 Shifting, Reflecting and Stretching Graphs (NJSLS-F-BF.B.3)

> 1.5. Combinations of Functions (NJSLS-F-BF.A.1, NJSLS-F-BF.A.1b, NJSLS-F-BF.A.1c)

> 1.6 Inverse Functions (Inverses Algebraically, No One-to-One) (NJSLS-F-BF.B.4, NJSLS-F-BF.B.4a, NJSLS-F-BF.B.4d)

Chapter 2: Polynomial and Rational Functions (Test 2.2 – 2.5)

> 2.2 Polynomial Functions of Higher Degree (NJSLS-A-SSE.A.2, NJSLS-A-APR.B3, NJSLS- F-IF.C.7, NJSLS- F-IF.C.7c)

> 2.4 Complex Numbers (not in-depth, just review) (NJSLS-N-CN.A.1, NJSLS-N-CN.A. 2, NJSLS-N-CN.A. 3, NJSLS -N-CN.C.7, NJSLS-A-REI.B.4b)

> 2.5 The Fundamental Theorem of Algebra (NJSLS-N-CN.C.7, NJSLS-N-CN.C.9)

Chapter 2: Polynomial and Rational Functions (Test 2.6 – 2.7)

> 2.6 Rational Functions and Asymptotes (Including Slant Asymptotes) (NJSLS-A-SSE.A.1.a, NJSLS-A-SSE.A.1.b, NJSLS- A- CED.A.2)

> 2.7 Graphs of Rational Functions (NJSLS-F-IF.C.7, NJSLS-F-IF.C.7.d)

2ⁿᵈ Marking Period – Unit 2

Chapter 3: Exponential and Logarithmic Functions (Test 3.1 – 3.4)

3.1 Exponential Functions and Their Graphs (NJSLS-A-SSE.B.3c, NJSLS -F-IF.C.7.e, NJSLS- F-IF.C.8b, NJSLS-F-LE.B.5)

3.2 Logarithmic Functions and Their Graphs (NJSLS. HSF-IF.C.7.e)

3.3 Properties of Logarithms (NJSLS-A-SSE.A.1, NJSLS- A-SSE.B.3c)

3.4 Solving Exponential and Logarithmic Equations (NJSLS-F-IF.C.8b, NJSLS- F-BF.B.4, NJSLS -F-BF.B.5, NJSLS -F- LE.A.1c)

*Use 3.5 Exponential and Logarithmic Models to Supplement Word Problems

Chapter 4: Trigonometric Function (Test 4.1 – 4.4)

4.1 Radian and Degree Measure (NJSLS-TF.A.1, NJSLS-G-C.B.5)

4.2 Trigonometric Functions: The Unit Circle (NJSLS-F-TF.A.2, NJSLS-F-TF.A.4)

4.3 Right Triangle Trigonometry (NJSLS-F-TF.B, NJSLS-G-SRT.C.6, NJSLS-G-SRT.C.8)

4.4 Trigonometric Functions of Any Angle (NJSLS-F-TF.A.3, NJSLS-F-TF.C.8)

Chapter 4: Trigonometric Function (Test 4.5 – 4.6)

4.5 Graphs of Sine and Cosine Functions (NJSLS-F-TF.B.5)

4.6 Graphs of Other Trigonometric Functions (NJSLS-F-TF.B.5)

3ʳᵈ Marking Period – Unit 3

Chapter 4: Trigonometric Function (Test 4.7 – 4.8)

4.7 Inverse Trigonometric Functions (NJSLS-N-Q.A.1, NJSLS-F-TF.B.6)

4.8 Applications and Models (NJSLS-N-Q.A.1, NJSLS-F-TF.B.5, NJSLS-F-TF.B.7)

Chapter 5: Analytic Trigonometry (Test 5.1 – 5.3)

5.1 Using Fundamental Identities (NJSLS-N-Q.A.1, NJSLS-F-TF.B.6, NJSLS-F-TF.C.8)

5.2 Verifying Trigonometric Identities (NJSLS-N-Q.A.1, NJSLS-F-TF.B.5, NJSLS-F-TF.B.7, NJSLS-F- TF.C.8)

5.3 Solving Trigonometric Equations (NJSLS-F-TF.C.9)

Chapter 5: Analytic Trigonometry (Test 5.4 – 5.5)

5.4 Sum and Difference Formulas (NJSLS-F-TF.C.9)

5.5 Multiple Angle and Product Sum Formulas (NJSLS-F-TF.C.9)

4th Marking Period – Units 4 and 5

Chapter 6: Additional Topics and Trigonometry (Test 6.1 – 6.2 and 6.3 – 6.4)

6.1 Law of Sines (NJSLS-G-SRT.D.9, NJSLS-G-SRT.D.10, NJSLS-G-SRT.D.11)

6.2 Law of Cosines (NJSLS-SG-SRT.D.10, NJSLS-SG-SRT.D.11)

6.3 Vectors in the Plane (NJSLS-N-VM.A.1, NJSLS-N-VM.A. 2, NJSLS-N-VM.B.4, NJSLS-N-VM.B.4a)

6.4 Vectors and Dot Products (NJSLS-N-VM.B.5b)

Chapter 9: Topics in Analytic Geometry (Test 9.5 -9.6)

9.5 Polar Coordinates (NJSLS-F-IF.C.7, NJSLS- F-TF.A.1, NJSLS -F-TF.A.2, NJSLS -F-TF.A.3, NJSLS-F-TF.A.4)

9.6 Graphs of Polar Equations (NJSLS-F-IF.C.7, NJSLS- F-TF.A.1, NJSLS -F-TF.A.2, NJSLS -F-TF.A.3, NJSLS -F-TF.A.4)

Chapter 11: Limits and an Introduction to Calculus (Test 11.1-11.4)

11.1 Introduction to Limits (NJSLS-F-BF.B.4d)

11.2 Techniques for Evaluating Limits (NJSLS-F-BF.B.4d)

11.3 The Tangent-Line Problem (NJSLS-F-TF.B.7)

11.4 Limits at Infinity and Limits of Sequences (NJSLS-F-BF.A.1a, c)

Course Expectations and Skills

- Students are required to have proficiency in all prerequisite topics for Algebra 1, Geometry and Algebra 2. Those who do not demonstrate proficiency will be required to seek additional help after school to close their achievement gap in order to be successful in this course.
- Students are strongly recommended to have a TI-84 Graphing calculator.
- Students are required to participate in both small and large group discussions and activities, as directed.
- Students are required to complete a project each marking period, including those which require the use of technology.
- Students are required to access online materials as warranted by the instructor.

Resources

Textbook: Precalculus with Limits A Graphing Approach 7e, **Larson**

Additional Resources: Cengage Web-Based videos and supplements

Assessment Information

Marking Period 1	Marking Period 2	Marking Period 3	Marking Period 4
Major (MAJ): Summative: 30%	Major (MAJ): Summative: 30%	Major (MAJ): Summative: 30%	Major (MAJ): Summative: 30%
Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%
Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%
Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%
Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%
Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%

PRE-CALCULUS SYLLABUS

2017-2018 Academic School-Year

1ˢᵗ Marking Period – Unit 1

Review Algebra Concepts – 2 Days Review, 1 Day Quiz

Chapter 1: Functions and Their Graphs (Test 1.2 - 1.6)

    1.2 Functions (NJSLS-HSA-CED.A.2, NJSLS-A-CED.A.4, NJSLS-F-IF.A.1, NJSLS-F-IF.A.2, NJSLS-F-IF.B.5, NJSLS-F-IF.B.6, NJSLS-F-LE.B.5)

    1.3 Graphs of Functions (Piecewise, No Step, No Even/Odd) (NJSLS-A-REI.D.10, NJSLS-F-IF.B.4, NJSLS-F-IF.C.7, NJSLS-F-IF.C.7b)

    1.4 Shifting, Reflecting, and Stretching Graphs (NJSLS-F-BF.B.3)

    1.5 Combinations of Functions (NJSLS-F-BF.A.1, NJSLS-F-BF.A.1b, NJSLS-F-BF.A.1c)

    1.6 Inverse Functions (Inverses Algebraically Only, No One-to-One) (NJSLS-F-BF.B.4, NJSLS-F-BF.B.4a, NJSLS-F-BF.B.4b, NJSLS-F-BF.B.4c, NJSLS-F-BF.B.4d)

Chapter 2: Polynomial and Rational Functions (Test 2.2-2.5)

    2.2 Polynomial Functions of Higher Degree (NJSLS-A-SSE.A.2, NJSLS-A-APR.B3, NJSLS-F-IF.C.7, NJSLS-F-IF.C.7c)

    2.4 Complex Numbers (NJSLS-N-CN.A.1, NJSLS-N-CN.A.2, NJSLS-N-CN.A.3, NJSLS-N-CN.C.7, NJSLS-A-REI.B.4b)

    2.5 The Fundamental Theorem of Algebra (NJSLS-N-CN.C.7, NJSLS-N-CN.C.9)

Chapter 2: Polynomial and Rational Functions (Test 2.6-2.7)

    2.6 Rational Functions and Asymptotes (Including Slant Asymptotes) (NJSLS-A-SSE.A.1.a, NJSLS-A-SSE.A.1.b, NJSLS-A-CED.A.2)

    2.7 Graphs of Rational Functions (NJSLS-F-IF.C.7, NJSLS-F-IF.C.7.d)

2ⁿᵈ Marking Period – Unit 1

Chapter 3: Exponential and Logarithmic Functions (Test 3.1 – 3.4)

    3.1 Exponential Functions and Their Graphs (NJSLS-A-SSE.B.3c, NJSLS-F-IF.C.7.e, NJSLS-F-IF.C.8b, NJSLS-F-LE.B.5)

    3.2 Logarithmic Functions and Their Graphs (NJSLS-F-IF.C.7.e)

    3.3 Properties of Logarithms (NJSLS-A-SSE.A.1, NJSLS-A-SSE.B.3c)

    3.4 Solving Exponential and Logarithmic Equations (NJSLS-F-IF.C.8b, NJSLS-F-BF.B.4, NJSLS-F-BF.B.5, NJSLS-F- LE.A.1c)

*Use 3.5 Exponential and Logarithmic Models to Supplement Word Problems

Chapter 4: Trigonometric Function (Test 4.1 – 4.2)

4.1 Radian and Degree Measure (NJSLS-F-TF.A.1, NJSLS-G-C.B.5)

4.2 Trigonometric Functions: The Unit Circle (NJSLS-F-TF.A.2, NJSLS-F-TF.A.4)

Chapter 4: Trigonometric Function (Test 4.3 – 4.4)

4.3 Right Triangle Trigonometry (NJSLS-F-TF.B, NJSLS-G-SRT.C.6, NJSLS-G-SRT.C.8)

4.4 Trigonometric Functions of Any Angle (NJSLS-F-TF.A.3, NJSLS-F-TF.C.8)

3rd Marking Period – Unit 3

Chapter 4: Trigonometric Function (Test 4.5 – 4.6)

4.5 Graphs of Sine and Cosine Functions (NJSLS-F-TF.B.5)

4.6 Graphs of Other Trigonometric Functions (NJSLS-F-TF.B.5)

Chapter 4: Trigonometric Function (Test 4.7 – 4.8)

4.7 Inverse Trigonometric Functions (NJSLS-N-Q.A.1, NJSLS-F-TF.B.6)

4.8 Applications and Models (No Bearings) (NJSLS-N-Q.A.1, NJSLS-F-TF.B.5, NJSLS-F-TF.B.7)

Chapter 5: Analytic Trigonometry (Test 5.1 – 5.3)

5.1 Using Fundamental Identities (NJSLS-N-Q.A.1, NJSLS-F-TF.B.6, NJSLS-F-TF.C.8)

5.2 Verifying Trigonometric Identities (NJSLS-N-Q.A.1, NJSLS-F-TF.B.5, NJSLS-F-TF.B.7, NJSLS-F- TF.C.8)

5.3 Solving Trigonometric Equations (NJSLS-F-TF.C.9)

4th Marking Period – Unit 4

Chapter 5: Analytic Trigonometry (Test 5.4 – 5.5)

5.4 Sum and Difference Formulas (NJSLS-F-TF.C.9)

5.5 Multiple-Angle and Product-to-Sum Formulas (NJSLS-F-TF.C.9)

Chapter 6: Additional Topics in Trigonometry (Test 6.1 – 6.2)

6.1 Law of Sines (NJSLS-G-SRT.D.9, NJSLS-G-SRT.D.10, NJSLS-G-SRT.D.11)

6.2 Law of Cosines (NJSLS-G-SRT.D.10, NJSLS-G-SRT.D.11)

Chapter 9: Topics in Analytic Geometry (Test 9.5 – 9.6)

　　　9.5 Polar Coordinates (NJSLS-F-IF.C.7, NJSLS-F-TF.A.1, NJSLS-F-TF.A.2, NJSLS-F-TF.A.3, NJSLS-F-TF.A.4)

　　　9.6 Graphs of Polar Equations (NJSLS-F-IF.C.7, NJSLS-F-TF.A.1, NJSLS-F-TF.A.2, NJSLS-F-TF.A.3, NJSLS-F-TF.A.4)

Vector Project: Chapter 6: Additional Topics in Trigonometry

　　　6.3 Vectors in the Plane (NJSLS-N-VM.A.1, NJSLS-N-VM.A.2, NJSLS-N-VM.B.4, NJSLS-N-VM.B.4a)

　　　6.4 Vectors and Dot Products (NJSLS-N-VM.B.5b)

Additional Topics as Time Permits

Chapter 11: Limits and an Introduction to Calculus

　　　11.1 Introduction to Limits (NJSLS-F-BF.B.4d)

　　　11.2 Techniques for Evaluating Limits (NJSLS-F-BF.B.4d)

Course Expectations and Skills

- Students are required to have proficiency in all prerequisite topics for Algebra 1, Geometry and Algebra 2. Those who do not demonstrate proficiency will be required to seek additional help after school to close their achievement gap in order to be successful in this course.
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Resources

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Additional Resources: Cengage Web-based videos and supplements
Boardworks (CCSS Powerpoints)
Kuta Software

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Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%
Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%
Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%	Minor (MIN): Formative: 25%
Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%
Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus & Pre-Calculus Honors
Course Number: 034300 & 034200

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Functions & Their Graphs Chapter 1	**Chapter 1 addresses functions and their representations in the Cartesian plane. Students are introduced to functions and learn to identify, categorize, and describe functions. They then learn to graph functions and represent simple transformations of the six most commonly used functions in algebra. The students will also investigate the composition of more than one function, inverse of a function, and the use of modeling real-world data. Finally, students will use specific math vocabulary associated with functions and their graphs.**
Grade Level(s): 10-12	

Essential Question(s):	Enduring Understanding(s):
What are the important defining characteristics of a function? **How is the graph of a function used to determine the key elements of that function?** **How do you write equations and draw graphs for the simple transformations of functions?** **How do you combine two functions to form a new function?** **What is the inverse of a function, and how do you represent it graphically and algebraically?**	- Determine whether a relation between two variables represent a function. - Use function notation and evaluate functions. - Find the domains of functions. - Use functions to model and solve real life problems. - Evaluate difference quotients. - Find the domains and ranges of functions and use the vertical line tests for functions - Determine intervals in which functions are increasing, decreasing, or constant. - Determine relative maximum and relative minimum values of functions. - Identify and graph piecewise-defined functions. - Recognize graphs of parent functions. - Use vertical and horizontal shifts to sketch graphs of functions. - Add, subtract, multiply, and divide functions. - Find compositions of one functions with another function. - Use combinations of functions to model and solve real-life problems. - Find inverse functions informally and verify that two functions are inverse functions of each other. - Find inverse functions algebraically.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**1.** NJSLS-A-CED.A.2
2. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*	**2.** NJSLS-A-CED.A.4
3. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then (*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = (*x*).	**3.** NJSLS-F-IF.A.1
	4. NJSLS-F-IF.A.2
4. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**5.** NJSLS-F-IF.B.5
	6. NJSLS-F-IF.B.6
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* ★	**7.** NJSLS-F-LE.B.5
	8. NJSLS-F-IF.B.4
6. 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.	**9.** NJSLS-F-IF.C.7
	10. NJSLS-F-IF.C.7b
7. Interpret the parameters in a linear or exponential function in terms of a context.	**11.** NJSLS-F-BF.B.3
8. 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.* ★	**12.** NJSLS-F-BF.A.1
	13. NJSLS-F-BF.A.1b
9. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	**14.** NJSLS-F-BF.A.1c
	15. NJSLS-F-BF.B.4
10. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	**16.** NJSLS-F-BF.B.4a
11. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*	**17.** NJSLS-F-BF.B.4b
	18. NJSLS-F-BF.B.4c
12. Write a function that describes a relationship between two quantities.	**19.** NJSLS-F-BF.B.4d
13. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and*	

relate these functions to the model.	**20.** **NJSLS-A-REI.D.10**
14. Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time*	
15. Find inverse functions.	
16. Solve an equation of the form $(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for x ≠1.*	
17. Verify by composition that one function is the inverse of another.	
18. Read values of an inverse function from a graph or a table, given that the function has an inverse.	
19. Produce an invertible function from a non-invertible function by restricting the domain.	
20. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	

Inter-Disciplinary Connections:

Mathematical Modeling:
1. Many natural phenomena can be modeled by functions, such as the force of water against a face of a dam.
  2. Graphs of functions provide visual relationships between two variables.
  3. Recognizing the graphs of parent functions and knowing how to shift, reflect, and stretch graphs of functions can help students sketch or describe the graphs of a wide variety of simple functions.
  4. Students can model the stopping distance of a car by combining the driver's reaction time with the car's braking distance.
  5. Students can use inverse functions to find the European shoe sizes from the corresponding U.S. shoe sizes.

Students will engage with the following text:

Pre-Calculus with a limits: A Graphing Approach 7e By Ron Larson

Resources: CourseMate; a variety of technology tools and other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Section 1.2

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 24-28 Exs.1-6, 7-15 odd, 16, 17-21 odd, 29-37 odd, 49-53 odd, 65-72, 80, 87-94	Day 1: pp. 24-28 Exs. 8-14 even, 18-28 even, 40-54, 73-78, 82, 84, 85-94

Section1.3

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 37-40 Exs.1-13, 17-31 odd, 35-45 odd, 53, 54, 55-59 odd, 73-85 odd, 91, 95, 97-104, 110, 113-120	Day 1: pp. 37-40 Exs. 7-10, 18-34 even, 48-52 eve, 60, 62, 64-90 even, 92-95, 99-120

Section 1.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 47-49 Exs.1-4, 5-45 odd, 51-57 odd, 65-70, 80-86	Day 1: pp. 47-49 Exs. 13-18, 22-28 even, 29-34, 36-50 even, 61-86

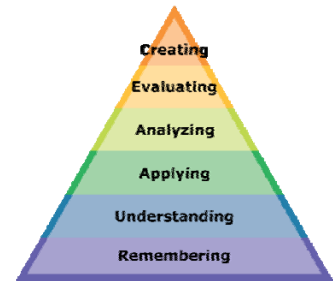**Section 1.5**

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 56-59 Exs.1-6, 7-25 odd, 37-49 odd, 55, 56, 61, 67-75 odd, 79, 80, 85, 86, 88-90, 96-100	Day 1: pp. 56-59 Exs. 1-6, 16-32 even, 38-44 even, 50-66 even, 67-70, 76-79, 81-88, 89-100

Section 1.6

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 67-70 Exs.1-6, 7-13 odd, 15-18, 25-49 odd, 57-85 odd, 93-103 odd, 115, 118-124, 130, 133-140	Day 1: pp. 67-70 Exs. 15-18, 20-30 even, 40-58 even, 72-80 even, 86-90 even, 91-100, 102-110 even, 115, 117-140

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP or 504 Plan.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Student Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.
- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-of-Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP or 504 Plan.

Performance Assessments:

The following assessments require students to utilize various strands of mathematics.
- Projects

- **Performance Tasks**
- **Homework**
- **Classwork**

Accommodations/Modifications:

As per IEP or 504 Plan.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus & Pre-Calculus Honors
Course Number: 034300 & 034200

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: Limits and an Introduction to Calculus Chapter 11	Unit Summary: In Chapter 11, students begin with an introduction to limits, including techniques for calculating the limit of a graph at a given value of x. Students then calculate the derivative of a function using differentiation rules. They also find the limit of functions at infinity. Finally, students will use specific math vocabulary associated with limits and calculus.
Grade Level(s): 10-12	
Essential Question(s): - How do you find and interpret the limit of a function for a certain value of x? - How do evaluate limits that cannot be solved through use of direct substitution? - How do you find the derivative of a function using differentiation rules? - How do you find the limits of functions at infinity?	**Enduring Understanding(s):** - Understand the limit concepts. - Use the definition of a limit to estimate limits. - Determine whether limits of functions exist. - Use properties of limits to evaluate limits. - Use the dividing out technique to evaluate limits of functions. - Use the rationalizing technique to evaluate limits of functions. - Use technology to approximate limits of functions graphically and numerically. - Evaluate one-sided limits of functions - Evaluate limits of difference quotients from calculus. - Use differentiation rules to find the derivative of functions. - Evaluate limits of functions at infinity.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. Determine an explicit expression, a recursive process, or steps for calculation from a context.	**1.** NJSLS- BF.A.1a.
2. Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.	**2.** NJSLS- F-BF.A.1c
3. Produce an invertible function from a non-invertible function by restricting the domain.	**3.** NJSLS- F-BF.B.4d
4. 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. .	**4.** NJSLS- F-TF.B.7

Inter-Disciplinary Connections:

> **Mathematical Modeling:**
> 1. Students can use limits to verify the maximum volume of an open box.
> 2. Students can use the limit of a position function to find the velocity of a free-falling object at any instant in time.
> 3. Students can use the derivative of a function to analyze the rate of change of the volume of a spherical balloon.
> 4. Students can use limits at infinity to decide whether a given model can be used to predict the mean salary of a financial manager in the United States.

Students will engage with the following text:

> **Pre-Calculus with a limits: A Graphing Approach 7e By Ron Larson**
> Resources: Course mate; a variety of technology tools and other texts as per teacher discretion.

Students will write:

> Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

> **Section 11.1**
>
> | | Regular | Honors |
> |---|---|---|
> | **Standards for Mathematical Practice** | MP 1- Make sense of problems and persevere in solving them
MP 2- Reason abstractly and quantitatively
MP 3- Construct viable arguments and critique
MP 4- Model with mathematics
MP 5- Use appropriate tools strategically
MP 6- Attend to precision
MP 7- Look for and make use of structure
MP 8- Look for and express regularity in repeated reasoning. | MP 1- Make sense of problems and persevere in solving them
MP 2- Reason abstractly and quantitatively
MP 3- Construct viable arguments and critique
MP 4- Model with mathematics
MP 5- Use appropriate tools strategically
MP 6- Attend to precision
MP 7- Look for and make use of structure
MP 8- Look for and express regularity in repeated reasoning. |
> | **Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)** | Day 1: pp. 757-758 Exs. 5, 6, 7-27 odd, 29-32, 33-39 odd
Day 2: pp. 758-759 Exs. 41-63 odd, 69-71, 74, 75-79 odd | Day 1: pp. 757-758 Exs. 6, 9-12, 14-28 even, 29-40
Day 2: pp. 758-759 Exs. 42-68 even, 71-74, 78, 80 |

Section 11.2

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 767-768 Exs. 5-17 odd, 27-47 odd Day 2: pp. 768-769 Exs. 49-55 odd, 61-69 odd, 70, 73, 83-86, 88, 89-95 odd	Day 1: pp. 767-768 Exs. 10-48 even Day 2: pp. 768-769 Exs. 50-56 even, 62-66 even, 70, 76-82 even, 85, 86-96 even

Section 11.3

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)		Day 1: pp. 777-778 Exs. 29-40, 55-58

Section 11.4

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)		Day 1: pp. 786-787 (13-38)

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Creating
Evaluating
Analyzing
Applying
Understanding
Remembering

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self- assessments, learning/response logs, discussion and practice presentations

Accommodations/Modifications:

As per IEP or 504 Plan.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an

instructional time period.

- **Diagnostic Pre-Test**
- **Chapter Tests**
- **Periodic Benchmark Tests**
- **End-of-Course Assessment**
- **Standardized Tests**

Accommodations/Modifications:

As per IEP or 504 Plan.

Performance Assessments:

The following assessments require students to utilize various strands of mathematics.

- **Projects**
- **Performance Tasks**
- **Homework**
- **Classwork**

Accommodations/Modifications:

As per IEP or 504 Plan.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus/ Pre-Calculus Honors
Course Number: 034300/ 034200

PART I: Unit Rationale
WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Polynomial and Rational Functions Chapter 2	In this Unit students learn to analyze and graph polynomial and rational functions. The chapter begins with identifying key characteristics and creating graphs of quadratic and other polynomial functions. Students then learn to use polynomial division to find both real and complex roots. Next they learn how to find asymptotes, intercepts and holes as they graph rational functions. Students will use specific math vocabulary associated with polynomial and rational functions.
Grade Level(s): 10-12	

Essential Question(s):	Enduring Understanding(s):
• **How do you sketch the graphs of polynomial functions?** • **How do you divide a polynomial by another polynomial and use polynomial division to find the rational and real zeros of polynomials?** • **How do you perform operations with complex numbers?** • **How do you find all the zeros of a polynomials function?** • **How do you find the domain and asymptotes of a rational function?** • **How do you sketch the graph of a rational function?**	• Use transformations to sketch graphs of polynomial functions. • Use the Leading Coefficient Test to determine end behavior of graphs of polynomial functions. • Find and use zeros of polynomial functions as sketching aids. • Use the Intermediate Value Theorem to help locate zeros of polynomial functions. • Use synthetic division to divide polynomials by binomials of the form $(x - k)$. • Use the imaginary unit i to write complex numbers. • Add, subtract, and multiply complex numbers. • Use complex conjugates to write the quotient of two complex numbers in standard form.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*	1. **NJSLS-A-SSE.A.2**
2 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	2. **NJSLS-N-CN.A.1**
3 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers**.**	3. **NJSLS-N-CN.A.2**
4. Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	4. **NJSLS-N-CN.A.3**
5. Solve quadratic equations with real coefficients that have complex solutions.	5. **NJSLS-N-CN.C.7**
6. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	6.. **NJSLS- A-REI.B.4b**
7. Solve quadratic equations with real coefficients that have complex solutions.	7. **NJSLS- N-CN.C.7**
8. Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	8. **NJSLS-N-CN.C.9**
9. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*	9. **NJSLS-A-SSE.A.1b**
10. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	10. **NJSLS-A-CED.A.2**
11. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	11. **NJSLS-F-IF.C.7**
12. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	12. **NJSLS-F-IF.C.7d**
13. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	13. **NJSLS-F-IF.C.7c**

Inter-Disciplinary Connections:

Mathematical Modeling:

- Students can use polynomial functions to model various aspects of nature, such as the growth of a red oak tree, as shown in Ex.112 pg. 111.
- Students will use complex numbers to model numerous aspects of the natural world, such as the impedance of an electrical circuit, as shown in Ex. 89 pg. 134.
- Students will be able to determine whether a football kicked with a given velocity can reach a certain height, as shown in Ex. 69 pg. 141.
- Students can determine the cost of supplying recycling bins to the population of a rural township, as shown in Ex. 49 pg. 150.
- Students can model the concentration of a chemical in the bloodstream after injection, as shown in Ex. 89 pg. 159.

Students will engage with the following text:

Pre-Calculus With Limits A Graphing Approach- 7e   Ron Larson

Resources : Coursemate; A variety of technology tools, other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Section 2.2

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 109-110 Ex. 1 – 19, 23-79 odd Day 2: pp. 110-112 Ex. 81-109 odd, 111-120, 123-131 odd	Day 1: pp. 109-110 Ex. 1 – 16, 21-28, 30-36 even, 44-80 even Day 2: pp. 110-112 Ex. 81-84, 90-108 even, 109-113, 121-131

Section 2.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 133-134 Ex. 1 – 10, 11-95 odd 97-100	Day 1: pp. 133-134 Ex. 7-10, 12-30 even, 36-48 even, 52-88 even, 89-100

Section 2.5

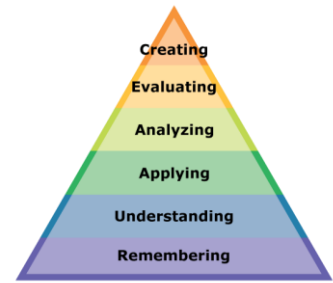|	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1 pp. 140-141 Ex. 2-4, 5-27 odd, 45-61 odd, 65-71 odd, 72, 74-78	Day 1: pp. 140-141 Ex. 10-16 even, 34-44 even, 53-58, 62-65, 69-73 odd, 74-78 even

Section 2.6

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 147-148 Ex. 2-16, 17-43 odd, Day 2: pp. 148-150 Ex. 45-48, 50-52, 56-62	Day 1: pp. 147-148 Ex. 6-10 even, 11-16, 18-32 even, 33-36, 42-44 Day2: pp. 148-150 Ex 45-49, 50-56 even, 57-64

Section 2.7

Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 157-158 Ex. 1-4, 5-23 odd, 33-53 odd, 57-60, 61-67 odd Day 2: pp. 158-160 Ex. 71-77 odd, 83-85, 87-89, 91, 93-96, 99-104	Day 1: pp. 157-158 Ex. 5-8, 13-16, 22-48 even, 68-70 Day 2: pp. 158-160 Ex. 79-86, 89-92, 95-107	

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR
UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per student IEP or 504 Plan

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Student Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.
- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End of Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per student IEP or 504 Plan

Performance Assessments:

The following assessments requires students to utilize various strands of mathematics.
- Projects
- Performance Tasks

- **Homework**
- **Classwork**

Accommodations/Modifications:

As per student IEP or 504 Plan

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus & Pre-Calculus Honors
Course Number: 034300 & 034200

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Exponential and Logarithmic Functions Chapter 3	In Chapter 3, students will work with exponential and logarithmic functions. They begin by writing, graphing, and recognizing the basic characteristics of exponential and logarithmic functions. Students learn how to use these functions to model real world problems including compound interest, radioactive decay, and human memory. They then expand their skills by using the properties of logarithms and exponents to manipulate expressions and solve equations. Finally, students will use specific math vocabulary associated with exponential and logarithmic functions.
Grade Level(s): 10-12	
Essential Question(s): • **How do you write and graph exponential functions?** • **How do you recognize, evaluate, and graph logarithmic functions?** • **How do you rewrite logarithmic expressions to simplify or evaluate them?** • **How do you solve exponential and logarithmic equations?**	**Enduring Understanding(s):** • Recognize and evaluate exponential functions with base a. • Graph exponential functions with base a. • Recognize, evaluate, and graph exponential functions with base e. • Use exponential functions to model and solve real life problems. • Recognize and evaluate logarithmic functions with base a. • Graph logarithmic functions with base a. • Recognize, evaluate, and graph natural logarithmic functions. • Use logarithmic functions to model and solve real life problems. • Rewrite logarithms with different bases. • Use properties of logarithms to evaluate or rewrite logarithmic expressions. • Use properties of logarithms to expand or condense logarithmic expressions. • Solve simple exponential and logarithmic equations. • Solve more complicated exponential and logarithmic equations. • Use exponential and logarithmic equations to model and solve real life problems.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJCCCS or CCS
1. Interpret expressions that represent a quantity in terms of its context.	**1.** NJSLS-A-SSE.A.1
2. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15t can be rewritten as (1.151/12) 12t ≈1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	**2.** NJSLS-A-SSE.B.3c
3. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**3.** NJSLS-F-IF.C.7e
4. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as y = (1.02)t , y = (0.97)t , y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.*	**4.** NJSLS-F-IF.C.8b
5. Find inverse functions.	**5.** NJSLS-F-BF.B.4
6. Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents	**6.** NJSLS-F-BF.B.5
7. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	**7.** NJSLS-F-LE.A.1c
8. Interpret the parameters in a linear or exponential function in terms of a context.	**8.** NJSLS-F-LE.B.5

Inter-Disciplinary Connections:

Mathematical Modeling:
1. Exponential functions are useful in modeling data that represents the depreciation of a new vehicle.
2. Logarithmic functions are useful in modeling data that represents the minimum required ventilation rates   in public school classrooms.
3. Logarithmic functions can be used to model the number of decibels of sound.
4. Exponential and logarithmic equations can be used to model the average heights of men and women.

Students will engage with the following text:

Pre-Calculus with a limits: A Graphing Approach 7e By Ron Larson
Resources: Coursemate; a variety of technology tools and other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> **will students uncover content and build skills.**

Section 3.1

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 189-191 Exs.1-4, 5-15 odd, 17-20, 21-29 odd, 33-39 odd, 49-59 odd, 65-71 odd, 75-78, 80, 85, 87	Day 1: pp. 189-191 Exs. 12-16 even, 17-20, 22-28 even, 42-56 even, 62-68 even, 69, 71-74, 77-80, 86, 88

Section 3.2

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per	Day 1: pp. 199-200 Exs. 1-6, 7-41 odd, 51-71, 77-85 odd Day 2: pp. 200-202 Exs. 89-103 odd, 109-112, 115-123 odd, 126,	Day 1: pp. 199-200 Exs. 8-22 even, 23-26, 32-50 even, 51-54, 56-68 even, 71-74, 81-86 Day 2: pp. 200-202 Exs. 90-98

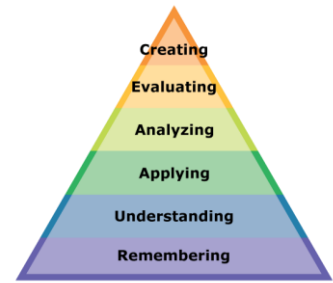|		
discretion of the teacher)	133-141 odd	even, 104-108 even, 109, 110, 112-114, 121-126, 130-142 even

Section 3.3

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 207-208 Exs. 2-4, 5-65 odd, 66 Day 2: pp. 208-209 Exs. 69-101 odd, 107, 109-112, 120, 123-129 odd	Day 1: pp. 207-208 Exs. 2-4, 10-18 even, 21-24, 26-44 even, 45, 46, 56-66 even Day 2: pp. 208-209 Exs. 78-84 even, 92-96, 105-107, 109, 110, 118-120, 122-130 even

Section 3.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 217-218 Exs. 1-6, 7-29 odd, 37-51 odd, 55-67 odd, 81-85 odd Day 2: pp. 218-220 Exs. 91-103 odd, 113-127 odd, 131-139 odd, 143-147 odd, 148, 149-153 odd, 154, 159-165 odd	Day 1: pp. 217-218 Exs. 1, 12-22 even, 28-36 even, 40-46 even, 50-54 even, 64-82 even, 86 Day 2: pp. 218-220 Exs. 102-116 even, 122-128 even, 136-146 even, 147, 148-152 even, 156, 158, 159, 162-166 even

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR
UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

As per IEP or 504 Plan.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Student Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.
- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-of-Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP or 504 Plan.

Performance Assessments:

The following assessments require students to utilize various strands of mathematics.
- Projects
- Performance Tasks

- **Homework**
- **Classwork**

Accommodations/Modifications:

As per IEP or 504 Plan.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus/ Pre-Calculus Honors
Course Number: 034300/ 034200

PART I: Unit Rationale
WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: **Trigonometric Functions Chapter 4**	Unit Summary: In this Unit students learn how to evaluate and graph the trigonometric functions, their inverses, and their reciprocals. The chapter begins by introducing radian measure and the definitions of trigonometric functions on the unit circle. Students then learn how to find trigonometric ratios of the acute angle by drawing a right triangle, and of any angle by drawing a unit circle and a reference angle. They also learn how to graph trigonometric functions and how to identify the basic characteristics of the trigonometric functions, their reciprocals, and their inverses. Finally, students use trigonometric ratios to solve problems in a variety of contexts, such as mechanics, biology, and navigation. Students will use specific math vocabulary associated with trigonometric functions.
Grade Level(s): 10-12	

Essential Question(s):	Enduring Understanding(s):
- How do you describe angles and angular movement? - How do you evaluate trigonometric functions by using the unit circle? - How do you use trigonometry to find unknown side lengths and angle measures in right triangles? - How do you evaluate trigonometric functions of any angle? - How do you sketch the graphs of sine and cosine functions? - How do you sketch the graphs of other trigonometric functions? - How do you evaluate and graph the inverses of trigonometric functions? - How do you use	- Describe angles. - Use radian measure. - Use degree measure and convert between degrees and radians. - Use angles to model and solve real life problems. - Identify the unit circle and describe its relationship to real numbers. - Evaluate trigonometric functions using the unit circle. - Use domain and period to evaluate sine and cosine functions and use a calculator to evaluate trigonometric functions. - Evaluate trigonometric functions of acute angles and use a calculator to evaluate trigonometric functions. - Use fundamental trigonometric identities. - Use trigonometric functions to model and solve real-life problems. - Evaluate trigonometric functions of any angle. - Find reference angles. - Evaluate trigonometric functions of real numbers. - Sketch the graphs of basic sine and cosine functions. - Use amplitude and period to help sketch the graphs of sine and cosine functions. - Sketch translations of graphs of sine and cosine functions. - Use sine and cosine functions to model real-life data. - Sketch the graphs of tangent functions. - Sketch the graphs of cotangent functions.

trigonometric functions to solve real life problems?	• Sketch the graphs of secant and cosecant functions. • Evaluate and graph inverse sine functions. • Evaluate and graph other inverse trigonometric functions. • Evaluate compositions of trigonometric functions. • Solve real life problems involving right triangles. • Solve real life problems involving directional bearings. • Solve real life problems involving harmonic motion.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1.Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	**1. NJSLS-F-TF.A.1 -**
2 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	**2. NJSLS-G-C.B.5**
3.Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	**3. NJSLS-F-TF.A.2**
4. Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	4. **NJSLS-F-TF.A.4**
5. Model periodic phenomena with trigonometric functions	**5. NJSLS-F-TF.B**
6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	6. **NJSLS- G-SRT.C.6**
7. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	7. **NJSLS-G-SRT.C.8**
8. Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, 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.	8. **NJSLS-F-TF.A.3**
9 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.	9. **NJSLS-F-TF.C.8**
10 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	10. **NJSLS-F-TF.B.5**
11. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	11. **NJSLS-N-Q.A.1** 12. **NJSLS-F-TF.B.6**
12 Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	13. **NJSLS-F-TF.B.7**
13. 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.	

Inter-Disciplinary Connections:

Mathematical Modeling:

- Students can determine the measure of an angle generated as a skater performs and axel jump, as shown in Ex. 110 pg. 263.
- Students can model the displacement from equilibrium of an oscillating weight suspended by a spring as a function of time, as shown in Ex. 75 pg. 271.
- Students can approximate the angle of elevation of a zip-line, as shown in Ex. 78 pg 282.
- Students can use trigonometric functions to model the monthly sales of a seasonal product, such as wakeboards, as shown in Ex. 124 pg. 291.
- Students can use a trigonometric function to model the percent of the moon's face that is illuminated for any given day in 2016 as shown in Ex. 87 pg. 301.
- Students can use a tangent function to model and analyze the distance between a television camera and a parade unit, as shown in Ex. 64 pg. 312.
- Students can investigate the relationship between the height of a cone-shaped pile of rock salt, the angle of the cone shape and the diameter of its base, as shown in Ex. 99 pg. 324.
- Students can use a trigonometric function to model the length of the shadow of the Sundial Bridge in Redding, California, as shown in Ex. 35 pg. 333.

Students will engage with the following text:

Pre-Calculus With Limits A Graphing Approach- 7e   Ron Larson

Resources : Coursemate; A variety of technology tools, other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

<u>How</u> will students uncover content and build skills.

Section 4.1

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 261-262 Ex. 5-12, 13-29 odd, 30, 31, 35-85 odd Day 2: pp. 263-264 Ex. 89-107 odd, 108-110, 113-118, 120, 123, 125	Day 1: pp. 261-262 Ex. 5, 6, 20-28 even, 32-42 even, 48-54 even, 68-88 even Day2: pp. 263-264 Ex. 90-104 even, 105-112, 116-120, 124-128 even

Section 4.2

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 270-271 Ex. 1-12, 13-69 odd Day 2: pp. 271-272 Ex. 71-87, 91,93	Day 1: pp. 270-271 Ex. 5-8, 10-22 even, 28-46 even, 47-52, 58-70 even Day 2: pp. 271-272 Ex. 72, 74-78, 84-90, 92, 94

Section 4.3

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1 pp. 280-281 Ex. 1, 3-6, 7-19 odd, 21-52, 53-65 odd Day 2: pp 281-283 Ex. 67-75 odd, 77-81, 84-87, 90-98	Day 1: pp 280-281 Ex. 13-30, 32-36 even, 45-52, 54-58 even, 59-66 Day 2: pp. 281-283 Ex. 68-76 even, 77-83, 87, 88, 90-98

Section 4.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp289-290 Ex. 1-10, 11-21 odd, 23-26, 27-83 odd Day 2: pp 290-291 Ex. 91-117 odd, 123, 124, 126-131, 134, 135-139 odd	Day 1: pp. 289-290 Ex. 1-10, 16-34 even, 35-38, 60-78 even Day 2: pp. 290-291 Ex. 86-108 even, 119-126, 131, 134-140 even

Section 4.5

Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 299-300 Ex. 1-20, 21-37 odd, 57-69 odd, 71-74, 75-79 odd Day2: pp. 301-303 Ex. 81, 82, 83-87odd, 89-92, 95-99, 101, 102, 105-108	Day 1: pp. 299-300 Ex. 1-9, 10-20even, 30-38 even, 39-42, 44-52 even, 67-87 Day 2: pp. 301-303 Ex. 85-88, 93-98, 101-108	

Section 4.6

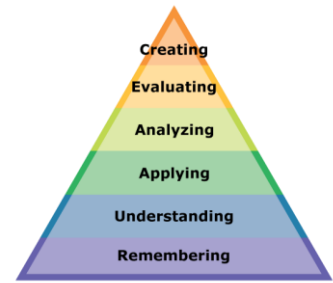|	Regular	Honors	
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 311-312 Ex. 1-8, 9-19odd, 29-47, 49, 51-55, 57 Day 2: pp 312-314 Ex. 59-66, 68-72, 75, 76, 78-87, 89	Day 1: pp. 311-312 Ex. 1, 4-8, 22-34 even, 35-46, 51-58 Day 2: pp. 312-314 Ex. 59-67, 72, 74, 77-86, 88, 90	

Section 4.7

	Regular	Honors	
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express	

		regularity in repeated reasoning.	regularity in repeated reasoning.	
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)		Day 1: pp. 322-323 Ex. 1-4, 5-13odd, 14-16, 17-71 odd Day 2: pp 324-325 Ex. 73-79 odd, 81-100, 102, 104-114, 119-126	Day 1: pp. 322-323 Ex. 1-4, 6-14 even, 15-18, 24-30 even, 34-52 even, 60-72 even Day 2: pp 324-3254 Ex. 73-103, 107-126	

Section 4.8

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp 332-334 Ex. 1-4, 5-43 odd Day 2: pp. 335-337 Ex. 47-52, 55-66, 68, 71-74, 76, 77-83 odd	Day 1: pp. 332-334 Ex. 12-24even, 28, 30, 31, 36-44 even Day 2: pp. 335-337 Ex. 45-54, 56-62 even, 63-65, 67-69, 76-84 even

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR
UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

>   The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

>   As per student IEP or 504 Plan

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Student Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.
- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End of Course Assessment
- Standardized Tests

Accommodations/Modifications:

>   As per student IEP or 504 Plan

Performance Assessments:

The following assessments requires students to utilize various strands of mathematics.
- Projects
- Performance Tasks

- **Homework**
- **Classwork**

Accommodations/Modifications:

As per student IEP or 504 Plan

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus & Pre-Calculus Honors

Course Number: 034300 & 034200

PART I: UNIT RATIONALE

<u>WHY</u> ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Analytic Trigonometry Chapter 5	In Chapter 5, students learn strategies for simplifying expressions and solving equations by using trigonometric identities. First, students learn how trigonometric functions can be rewritten by using identities and how to verify identities. Next, students learn how to solve trigonometric equations written in quadratic form and equations containing more than one angle. Then they study equations containing sums and differences of angles. Students rewrite trigonometric expressions that contain functions of multiple or half- angles and that involve squares or products of trigonometric functions. Finally, students will use specific math vocabulary associated with analytic trigonometry.
Grade Level(s):	
10-12	
Essential Question(s): • **How do you rewrite trigonometric expressions in order to simplify and evaluate trigonometric functions?** • **How do you verify a trigonometric identity?** • **How do you solve trigonometric equations written in quadratic form or containing more than one angle?** • **How do you simplify expressions and solve equations that contain sums or differences of angles?** • **How do you rewrite trigonometric expressions that contain functions of multiple or half-angles, or functions that involve squares or products of trigonometric expressions?**	**Enduring Understanding(s):** • Recognize and write the fundamental trigonometric identities. • Use the fundamental trigonometric identities to evaluate trigonometric functions, simplify trigonometric expressions, and rewrite trigonometric expressions. • Verify trigonometric identities. • Use standard algebraic techniques to solve trigonometric equations. • Solve trigonometric equations of quadratic type. • Solve trigonometric equations involving multiple angles. • Use inverse trigonometric functions to solve trigonometric equations. • Use sum and difference formulas to evaluate trigonometric functions, verify trigonometric identities and solve trigonometric equations. • Use multiple-angle formulas to rewrite and evaluate trigonometric functions. • Use half-angle formulas to rewrite and evaluate trigonometric functions.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	**1.** NJSLS-F-TF.B.5
2. Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	**2.** NJSLS-F-TF.B.6
3. 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.	**3.** NJSLS-F-TF.B.7
4. 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.	**4.** NJSLS-F-TF.C.8
5. Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	**5.** NJSLS-F-TF.C.9
6. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**6.** NJSLS-N-Q.A.1

Inter-Disciplinary Connections:

Mathematical Modeling:
1. The fundamental trigonometric identities can be used to simplify an expression for the coefficient of friction.
2. Students can use trigonometric identities to simplify an equation that models the length of a shadow cast by a gnomon (a device used to tell time).
3. Students can use trigonometric equations to help answer questions about monthly sales of skis.
4. Students can use sum and difference formulas to rewrite a trigonometric expression in a form that helps them find the equation of a standing wave.
5. Students can use a variety of trigonometric formulas to determine the apex angle of a sound wave cone caused by the speed of an airplane.

Students will engage with the following text:

Pre-Calculus with a limits: A Graphing Approach 7e By Ron Larson
Resources: Course mate; a variety of technology tools and other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS
DESCRIBE THE LEARNING EXPERIENCE.
<u>How</u> will students uncover content and build skills.

Section 5.1

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 354-355 Exs. 1-6, 7-19 odd, 21-32, 33-61 odd Day 2: pp. 355-356 Exs. 65-71, 73, 79-89 odd, 95-103 odd, 107-113 odd, 117-121, 123-129 odd	Day 1: pp. 354-355 Exs. 3-6, 14-20 even, 21-44, 46-64 even Day 2: pp. 355-356 Exs. 66-70 even, 76-84 even, 92-106 even, 109-120, 124, 126-130

Section 5.2

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 362-363 Exs. 1-10, 11-23 odd, 29, 30, 31-41 odd, 53-61 odd Day 2: pp. 363-364 Exs. 63-77 odd, 79-84, 89, 90, 95, 97	Day 1: pp. 362-363 Exs. 16-20, 29, 30, 32-62 even Day 2: pp. 363-364 Exs. 63-74, 77, 78, 85-94, 96, 98

Section 5.3

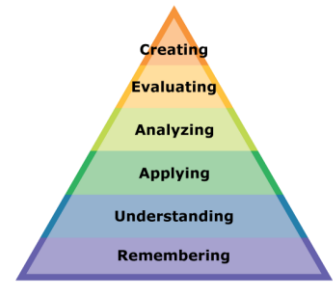|	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 373-374 Exs. 3, 4, 5-21 odd, 29-43 odd, 49-59 odd Day 2: pp. 374-376 Exs. 65-77 odd, 81-85 odd, 93-101 odd, 107-116	Day 1: pp. 373-374 Exs. 12-24 even, 30-48 even, 54-60 even Day 2: pp. 374-376 Exs. 66-76 even, 82-94 even, 95, 97, 98, 101-104, 112

Section 5.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 381-382 Exs. 1-8, 11-25 odd, 31-39, 41, 45-67 odd Day 2: pp. 382-383 Exs. 69-89 odd, 90-93, 97-103 odd, 106, 107, 109, 111	Day 1: pp. 381-382 Exs. 10-44 even, 49-52, 57-60, 62-68 even Day 2: pp. 382-383 Exs. 69-72, 76-88 even, 89, 90, 94-102, 103-108

Section 5.5

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 390-391 Exs. 1-15 odd, 21-35 odd, 45, 57-65 odd, 69-73 odd, 85, 87 Day 2: pp. 391-393 Exs. 89, 91, 97-105 odd, 111-139 odd	Day 1: pp. 390-391 Exs. 16-30 even, 42-54 even, 62-72 even, 75, 76, 80-92 even Day 2: pp. 392-393 Exs. 94-106 even, 112-120 even, 121-126, 129-134

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self- assessments, learning/response logs, discussion and practice presentations.

Accommodations/Modifications:

As per IEP or 504 Plan.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.

- Diagnostic Pre-Test
- Chapter Tests
- Periodic Benchmark Tests
- End-of-Course Assessment
- Standardized Tests

Accommodations/Modifications:

As per IEP or 504 Plan.

Performance Assessments:

The following assessments require students to utilize various strands of mathematics.

- Projects
- Performance Tasks

- **Homework**
- **Classwork**

Accommodations/Modifications:

As per IEP or 504 Plan.

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Precalculus/ Precalculus Honors

Course Number: 034300/ 034200

PART I: Unit Rationale

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Additional Topics in Trigonometry Chapter 6	**In this Unit, students learn how to apply trigonometry to oblique triangles, vectors, and complex numbers. They begin the chapter by learning how to find side lengths, angles, and areas of oblique triangles by using the Law of Sines and Law of Cosines. They then study vectors and vector notation, using trigonometry to solve real world problems such as finding force on an incline ramp or a wind-adjusted bearing in airplane navigation. The students will use specific math vocabulary associated with Law of Sines, Law of Cosines and Vectors.**
Grade Level(s): 10 - 12	
Essential Question(s): • **How do you use trigonometry to solve and find the areas of oblique triangles?** • **How do you represent and perform operations with vector quantities?** • **How do you write a vector as a sum of two vector components?**	Enduring Understanding(s): • Use the Law of Sines to solve oblique triangles.(AAS or ASA) • Use the Law of Sines to solve oblique triangles (SSA). • Find areas of oblique triangles and use the Law of Sines to model and solve real-world problems. • Use the Law of Cosines to solve oblique triangles (SSS or SAS). • Use the Law of Cosines to model and solve real-life problems. • Use Heron's Area Formula to find the areas of triangles. • Represent vectors as directed line segments. • Write the component form of vectors. • Perform basic vector operations and represent vectors graphically. • Write vectors as linear combinations of unit vectors. • Find the direction angles of vectors. • Use vectors to model and solve real life problems. • Find the dot product of two vectors and use the properties of the dot product. • Find the angle between two vectors and determine whether two vectors are orthogonal. • Write vectors as the sums of two vector components. • Use the vectors to find the work done by a force.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. 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	1. NJSLS-G-SRT.D.9
2. Prove the Laws of Sines and Cosines and use them to solve problems.	2. NJSLS-G-SRT.D.10
3. Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces	3. NJSLS-G-SRT.D.11
4. 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)...	4. NJSLS-N-VM.A.1
5 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	5. NJSLS-N-VM.A.2
6. Add and subtract vectors.	6. NJSLS-N-VM.B.4
7. 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.	7. NJSLS-N-VM.B.4a
8. Compute the magnitude of a scalar multiple cv using $\|cv\| = |c|v$. Compute the direction of cv knowing that when $|c|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).	8. NJSLS-N-VM.B.5b

Inter-Disciplinary Connections:

Mathematical Modeling:

- **Students can show how the Law of Sines can be used to help determine the distance from a boat to the shoreline, as shown in Ex. 48 pp. 411.**
- **Students can show how the Law of Cosines can be used to determine the lengths of the guy wires that anchor a tower, as shown in Ex. 53 pp. 418.**
- **Students can show how vectors can be used to determine the tension in the cables of two cranes lifting an object, as shown in Ex. 99 pp. 431.**
- **Students can show how dot product can be used to find the force necessary to keep a truck from**

rolling down a hill, as shown in Ex. 73 pp. 441.

Students will engage with the following text:

Precalculus With Limits A Graphing Approach- 7e   Ron Larson
Resources: Course mate; A variety of technology tools, other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Section 6.1

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 410-412 Ex. 7-19 odd, 27-51 odd, 54, 56-59	Day 1: pp. 410-412 Ex. 12, 18-42 even, 44-50, 55-62

Section 6.2

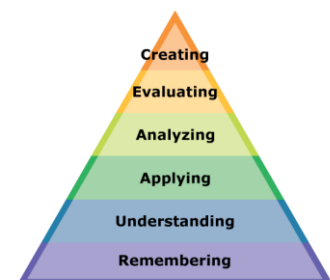|	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp. 417-419 Ex. 1-6, 7-15 odd, 25-30, 31-41 odd, 47-50, 53, 55, 59, 60, 64, 67-70	Day 1: pp. 417-419 Ex. 11-18, 25-30, 32-48 even, 50-58, 61, 64, 66-70

Section 6.3

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1 pp. 429-430 Ex. 1-12, 13-23 odd, 25-34, 37, 39, 43-46, 47-59 odd, 67-71 odd Day 2: pp 430-433 Ex. 75-91 odd, 95-98, 103, 107-119, 124, 127-133 odd	Day 1: pp 429-430 Ex. 16-42 even, 43-46, 54-72 even Day 2: pp 430-433 Ex. 82-90 even, 91-96, 98, 101, 103, 104, 106, 111-126

Section 6.4

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per the discretion of the teacher.)	Day 1: pp 440-441 Ex. 1-10, 11-53 odd, 57, 59 Day 2: pp 441-442 Ex. 61-65, 67, 69, 70, 71-77 odd, 79-85, 91-99 odd	Day 1: pp. 440-441 Ex. 1-6, 8-60 even Day 2: pp 441-442 Ex. 61-65, 69-78, 84-88, 92-100 even

PART IV: EVIDENCE OF LEARNING

IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self- assessments, learning/response logs, discussion and practice presentations

Accommodations/Modifications:

As per student IEP or 504 Plan

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the PreCalculus curriculum/syllabus at the conclusion of an instructional time period.

- **Diagnostic Pre-Test**
- **Chapter Tests**
- **Periodic Benchmark Tests**
- **End of Course Assessment**
- **Standardized Tests**

Accommodations/Modifications:

As per student IEP or 504 Plan

Performance Assessments:

The following assessments requires students to utilize various strands of mathematics.

- **Projects**
- **Performance Tasks**
- **Homework**
- **Classwork**

Accommodations/Modifications:

As per student IEP or 504 Plan

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: Pre-Calculus & Pre-Calculus Honors
Course Number: 034300 & 034200

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Topics in Analytic Geometry Chapter 9	In Chapter 9, students are introduced to polar forms for writing and graphing equations. They use polar coordinates to represent and solve problems. Students also work with these coordinates and equations by converting them from polar form to rectangular form and vice versa. They use the polar equations to identify each type of specific polar graph. Finally, students will use specific math vocabulary associated with analytic geometry.
Grade Level(s): 10-12	
Essential Question(s): **How do you describe the position of a point in a plane using distance and angle rather than x- and y-coordinates?** **How do you sketch graphs of polar equations?**	**Enduring Understanding(s):** - Plot points and find multiple representations of points in the polar coordinate system. - Convert points from rectangular to polar form and vice versa. - Convert equations from rectangular to polar form and vice versa. - Recognize special polar graphs.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.

After each target, identify the New Jersey Student Learning Standards that are applicable.

Learning Target	NJSLS
1. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases...	**1.** NJSLS-F-IF.C.7.
2. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	**2.** NJSLS-F-TF.A.1.
3. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	**3.** NJSLS-F-TF.A.2
4. Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π–x, π+x, and 2π–x in terms of their values for x, where x is any real number.	**4. NJSLS-F-TF.A.3**
5. Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	**5. NJSLS-F-TF.A.4**

Inter-Disciplinary Connections:

Mathematical Modeling:

1. Students can use polar coordinates to model the path of a passenger car on a Ferris wheel.

2. Students cans use graphs of polar equations to recognize the sound pickup pattern of a microphone in the polar coordinate system.

Students will engage with the following text:

Pre-Calculus with a limits: A Graphing Approach 7e By Ron Larson

Resources: Course mate; a variety of technology tools and other texts as per teacher discretion.

Students will write:

Students will write notes and copy class examples to better comprehend the skills being taught. Students will write solutions to open-ended math problems and word problems dealing with real-world applications. Students will graph interpretations of functions.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS

DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills.

Section 9.5

	Regular	Honors
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 681 Exs. 3-8, 9-41 odd Day 2: pp. 682 Exs. 43-57 odd, 71-87 odd, 91-94, 97-100	Day 1: pp. 681 Exs. 3, 4, 12-42 even Day 2: pp. 682 Exs. 44-58 even, 57-66, 72-80 even, 83-88, 93, 94, 97-100

Section 9.6

	Regular	**Honors**
Standards for Mathematical Practice	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.	MP 1- Make sense of problems and persevere in solving them MP 2- Reason abstractly and quantitatively MP 3- Construct viable arguments and critique MP 4- Model with mathematics MP 5- Use appropriate tools strategically MP 6- Attend to precision MP 7- Look for and make use of structure MP 8- Look for and express regularity in repeated reasoning.
Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 689-690 Exs. 1-14, 31-35 odd	Day 1: pp. 689-690 Exs. 1-14, 31-36

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS. IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self- assessments, learning/response logs, discussion and practice presentations

Accommodations/Modifications:

As per IEP or 504 Plan.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the Pre-Calculus curriculum/syllabus at the conclusion of an instructional time period.

- **Diagnostic Pre-Test**
- **Chapter Tests**
- **Periodic Benchmark Tests**
- **End-of-Course Assessment**
- **Standardized Tests**

Accommodations/Modifications:

As per IEP or 504 Plan.

Performance Assessments:

The following assessments require students to utilize various strands of mathematics.

- **Projects**
- **Performance Tasks**
- **Homework**
- **Classwork**

Accommodations/Modifications:

As per IEP or 504 Plan.