

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): <ul style="list-style-type: none"> 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): <ul style="list-style-type: none"> 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.

<u>Learning Target</u>	<u>NJSLS</u>
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. NJSLS- F-BF.B.4d
3. Produce an invertible function from a non-invertible function by restricting the domain.	4. NJSLS- F-TF.B.7
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.	

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

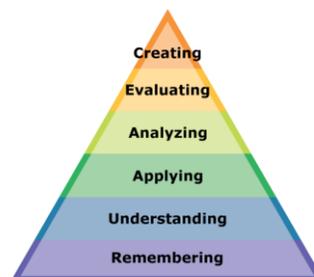
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Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)		Day 1: pp. 786-787 (13-38)

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.

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.