

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: Exponential and Logarithmic Functions Chapter 3	Unit Summary: 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	(Continuation of Unit Summary from above)
Essential Question(s): <ul style="list-style-type: none"> • 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): <ul style="list-style-type: none"> • 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. <i>For example the expression $1.15t$ can be rewritten as $(1.151/12) 12t \approx 1.01212t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i>	2. NJSLS-A-SSE.B.3c 3. NJSLS-F-IF.C.7e
3. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	4. NJSLS-F-IF.C.8b
4. Use the properties of exponents to interpret expressions for exponential functions. <i>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.</i>	5. NJSLS-F-BF.B.4 6. NJSLS-F-BF.B.5
5. Find inverse functions.	7. NJSLS-F-LE.A.1c
6. Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents	8. NJSLS-F-LE.B.5
7. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	
8. Interpret the parameters in a linear or exponential function in terms of a context.	

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.

How 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
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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.