

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: Analytic Trigonometry Chapter 5	Unit Summary: 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): <ul style="list-style-type: none"> • 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): <ul style="list-style-type: none"> • 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-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--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.

How 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

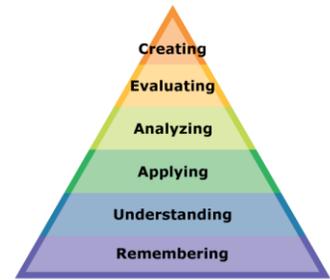
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Practice and Apply Assigning Homework (Tasks are assigned as per discretion of the teacher)	Day 1: pp. 381-382 Exs. 1-8, 11-25 odd, 31-39, 41, 45-67 odd Day 2: pp. 382-383 Exs. 69-89 odd, 90-93, 97-103 odd, 106, 107, 109, 111	Day 1: pp. 381-382 Exs. 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.