POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra: Grades 11 - 12	Unit 1:	Linear and Piecewise Functions	Time Frame:	25 days

NATIONAL COMMON CORE STANDARDS:

Reasoning with Equations and Inequalities
- **A.REI.3.1** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Building Functions
- **F.BF.1** Write a function that describes a relationship between two quantities.

Seeing Structure in Expressions
- **A.SSE.1a** Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.

Creating Equations
- **A.CED.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- **A.CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- **A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Interpreting Functions
- **F.IF.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.*
- **F.IF.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.
- **F.IF.7b** Graph piecewise-defined functions, including step functions and absolute value functions.

MATHEMATICAL PRACTICES:

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

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
How can functions be represented in multiple ways? **How can they be useful in modeling given situations?** **How do various functions compare to each other?** **How can new functions be created from linear functions?** **How can linear functions be used in real-life situations?** **What does the number of solutions (none, one, or infinite) of a system of linear equations represent?**	Domain Function Input Intercept Linear Ordered pairs Output Range Rate of change Slope Table T-Chart	<u>**Formative:**</u> - Journals/logs - KWL chart - At the bell activities - Question and answer - Individual white boards/Promethean Board ActiVotes - Homework - Quizzes - Constructed response/open-ended problem solving - Performance tasks - Exit slips <u>**Summative:**</u> - CDT's - Performance based assessments - Quizzes - Tests - Constructed response/open-ended problem solving - Performance tasks - Project

	PA CORE STANDARDS	
UNIT OF INSTRUCTION: **Linear and Piecewise Functions**	**CC.2.1.HS.D.1** Interpret the structure of expressions to represent a quantity in terms of its context. **CC.2.1.HS.D.2** Write expressions in equivalent forms to solve problems. **CC.2.1.HS.D.7** Create and graph equations or inequalities to describe numbers or relationships. **CC.2.1.HS.D.8** Apply inverse operations to solve equations or formulas for a given variable. **CC.2.1.HS.D.10** Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	

Essential Understandings/Learning Activities:
- Ability to determine the relationship between data and the corresponding function.
- Ability to recognize key features of graphs and tables including: intercepts; intervals where the function is increasing/decreasing, positive/negative.
- Ability to identify slope in terms of rate of change.
- Ability to solve equations (interval notation where applicable), including rearranging formulas.
- Ability to create equations.
- Ability to identify domain.
- Ability to use technology to graph and find intercepts.
- Ability to graph, including step and absolute value.
- Ability to identify key features of graphs: intercepts, maximums and minimums, symmetry.

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES: Teacher directed differentiated instructional projects and activities are ongoing and based on student need.	
ENRICHMENT:	**REMEDIATION:**
- Pearson SuccessNet On-Line Teacher's Edition - Pearson on-line resources and materials - USA Test Prep - Web-based Math Resources - Small group instruction - Teacher generated/differentiated instruction enrichment and activities - Supporting the range of learners as per teacher manual - Encourage and support learners in explaining how they applied their skills during mathematical tasks - http://www.artofproblemsolving.com/liz/Alcumus/index.php - Enrichment based on student GIEP or need of student	- Pearson Successnet On-Line Teacher's Edition - Pearson on-line resources and materials - Web-based Math Resources - Supporting the range of learners as per teacher manual - Teacher generated/differentiated instruction activities - Small group instruction - Adapted assignments - Additional time - Alternative Assessments - Chunking of content, assignment and/or assessments - One-on-one re-teaching - Volunteer/peer tutoring - Accommodations based on IEP and/or need - ELL student(or based on student need) additional support - Provide specific examples - Use of Manipulatives - Simplified language in word problems - Visuals - Flashcards - Multiple-meaning words - Bilingual dictionary/picture dictionary - Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:

- Pearson Algebra II: Unit: 1
- Prentice Hall Algebra II: Units: 1, 2, 7
- PDE SAS portal: http://www.pdesas.org
- Thinking Maps
- Graphing calculator
- Exit Tickets
- Adaptions checklist
- ELL Instructional Strategies for Math
- ESL Resources
  - Click on "Academic" from PMSD website
  - Click on "English Language Arts" on left side of tool bar
  - Click on the link for ESL
  - Click on Teacher
- Teacher generated/differentiated instruction resources and activities
- Algebra II released state sample questions
- Algebra II generated sample questions
- Promethean Flipcharts/ActiVotes
- Math flipcharts
- Math Internet Resources from PMSD Resource Page
- USA Test Prep
- Engage NY
- Geogebra
- http://www.khanacademy.org/
- Thinkfinity website: http://www.thinkfinity.org/home
- IXL Website: http://www.IXL.com/math/
- United Streaming: http://streaming.discoveryeducation.com/index.cfm
- http://edhelper.com/place_value.html
- http://illuminations.nctm.org
- http://insidemathematics.org
- www.teachingchannel.org
- www.Learnzillion.com
- http://illustrativemathematics.org/standards/k8
- http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
- www.teachingchannel.org
- http://www.learnzillion.com
- http://www.teacherspayteachers.com
- flexmath.ck12.org/
- http://map.mathshell.org

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra: Grades 11 - 12	Unit 2:	Polynomial Functions	TIME FRAME:	25 days

NATIONAL COMMON CORE STANDARDS:

The Complex Number System
- **N.CN.1** 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.
- **N.CN.2** Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
- **N.CN.7** Solve quadratic equations with real coefficients that have complex solutions.

Arithmetic with Polynomials and Rational Expressions
- **A.APR.1** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
- **A.APR.3** Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Reasoning with Equations and Inequalities
- **A.REI.11** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Interpreting Functions
- **F.IF.4** Interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features.
- **F.IF.5** Relate the domain of a function to its graph and to the quantitative relationship it describes.
- **F.IF.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases, and using technology for more complicated cases.
- **F.IF.7c** Analyze functions using different representations. Graph functions by factoring, identifying zeros and showing end behavior.

Building Functions
- **F.BF.1b** Build a function that models a relationship between two quantities. Combine standard function types using arithmetic operations.

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

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
What key features of higher degree polynomial functions distinguish them from those linear functions? **How can you find a solution to a polynomial equation algebraically and graphically?** **How can features of a polynomial function such as the equation, solutions, axis of symmetry, vertex, etc. be represented in tables, equations, and in "real world" contexts?** **How do zeros represent solutions to polynomial equations?**	Axis of Symmetry Complex Number Domain Factoring Imaginary Number Inverse Maximum minimum Parabola Polynomial Quadratic Range Root Solution Vertex Zero	**<u>Formative:</u>** - Journals/logs - KWL chart - At the bell activities - Question and answer - Individual white boards/Promethean Board ActiVotes - Homework - Quizzes - Constructed response/open-ended problem solving - Performance tasks - Exit slips **<u>Summative:</u>** - CDT's - Performance based assessments - Quizzes - Tests - Constructed response/open-ended problem solving - Performance tasks - Project

	PA CORE STANDARDS	
UNIT OF INSTRUCTION: Polynomial Functions	**CC.2.1.HS.F.6** Extend the knowledge of arithmetic operations and apply to complex numbers. **CC.2.1.HS.F.7** Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems. **CC.2.2.HS.C.5** Construct and compare linear, quadratic, and exponential models to solve problems. **CC.2.2.HS.C.6** Interpret functions in terms of the situations they model. **CC.2.2.HS.D.4** Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. **CC.2.2.HS.D.5** Use polynomial identities to solve problems. **CC.2.2.HS.D.7** Create and graph equations or inequalities to describe numbers or relationships. **CC.2.2.HS.D.9** Use reasoning to solve equations and justify the solution method.	

Essential Understandings/Learning Activities:
- Ability to connect key features of graphs and tables including: intercepts, intervals where the function is increasing/decreasing, positive/negative; relative maximum/minimum, symmetries, and end behavior.
- Ability to identify domain in the appropriate context
- Ability to understand the relationships between zero and factors in relation to graphs of polynomials.
- Ability to graph quadratic functions in standard/vertex forms.
- Ability to solve quadratics by using the quadratic formula and the zero product property (solutions will be displayed in interval notation).
- Ability to perform arithmetic operations on polynomials.
- Ability to find zeros, factors, and imaginary solutions to polynomial functions.
- Ability to perform operations on complex numbers in the form a + bi.
- Ability to interpret complicated expressions by breaking it down into smaller parts.
- Ability to use graphing calculators to graph/solve more complicated functions (solutions will be displayed in interval notation).

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:
Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

<table>
<tr><th>ENRICHMENT:</th><th>REMEDIATION:</th></tr>
<tr>
<td>

- Pearson SuccessNet On-Line Teacher's Edition
- Pearson on-line resources and materials
- USA Test Prep
- Web-based Math Resources
- Small group instruction
- Teacher generated/differentiated instruction enrichment and activities
- Supporting the range of learners as per teacher manual
- Encourage and support learners in explaining how they applied their skills during mathematical tasks
- http://www.artofproblemsolving.com/liz/Alcumus/index.php
- Enrichment based on student GIEP or need of student

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- Pearson Successnet On-Line Teacher's Edition
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- Small group instruction
- Adapted assignments
- Additional time
- Alternative Assessments
- Chunking of content, assignment and/or assessments
- One-on-one re-teaching
- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
  - Provide specific examples
  - Use of Manipulatives
  - Simplified language in word problems
  - Visuals
  - Flashcards
  - Multiple-meaning words
  - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

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</table>

RESOURCES:

- Pearson Algebra II: Units: 1,2, 3, 5
- Prentice Hall Algebra II: Units: 1, 2, 5, 6, 7
- PDE SAS portal: http://www.pdesas.org
- Thinking Maps
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- IXL Website: http://www.IXL.com/math/
- United Streaming: http://streaming.discoveryeducation.com/index.cfm
- http://edhelper.com/place_value.html
- http://illuminations.nctm.org
- http://insidemathematics.org
- www.teachingchannel.org
- www.Learnzillion.com
- http://illustrativemathematics.org/standards/k8
- http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
- www.teachingchannel.org
- http://www.learnzillion.com
- http://www.teacherspayteachers.com
- flexmath.ck12.org/
- www.cde.ca.gov/ci/ma/cf/documents/aug2013algebra2.pdf
- www.engagenj.org/node/4641/file/5896
- http://map.mathshell.org/materials/lessons.php?taskid-432&subpage=problem
- http://map.mathshell.org/materials/lessons.php?taskid-436&subpage=problem
- http://map.mathshell.org/materials/lessons.php?taskid-437&subpage=problem
- Geogebra

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra : Grades 11-12	Unit 3:	Exponential and Logarithmic Functions	TIME FRAME:	30 days

NATIONAL COMMON CORE STANDARDS:	MATHEMATICAL PRACTICES:
Interpreting Functions • **F.IF.7e** Graph functions using different representations. Graph exponential and logarithmic functions, showing intercepts and end behavior. **Linear, Quadratic, and Exponential Models** • **F-LE.1.a** Construct and compare linear, quadratic and exponential models and solve problems. Prove simple laws of logarithms. • **F.LE.4** Construct and compare linear, quadratic and exponential models and solve problems. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. • Use the definition of logarithms to translate between logarithms of any base. • Understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values.	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
• **How do you evaluate exponential functions for given values? logarithmic functions?** • **How do you solve exponential and logarithmic equations?** • **How do you use exponential models so solve real-world problems?** • **How do you change bases in logarithmic expressions?** • **How do you use properties of logarithms to evaluate**	Asymptote Base Domain Evaluate Exponential Logarithmic Power Product Quotient Range	<u>**Formative:**</u> • Journals/logs • KWL chart • At the bell activities • Question and answer • Individual white boards/Promethean Board ActiVotes • Homework • Quizzes • Constructed response/open-ended problem solving • Performance tasks • Exit slips <u>**Summative:**</u> • CDT's • Performance based assessments o Quizzes o Tests o Constructed response/ open-ended problem solving o Performance tasks

or rewrite expressions?		o Project

<table>
<tr><td rowspan="2" style="writing-mode:vertical">**UNIT OF INSTRUCTION:** Exponential and Logarithmic Functions</td><td colspan="1">**PA CORE STANDARDS**</td><td></td></tr>
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CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.

CC.2.1.HS.D.2 Write expressions in equivalent forms to solve problems.

CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.

CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.

CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.

CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems.

CC.2.2.HS.C.6 Interpret functions in terms of the situation they model.

Essential Understandings/Learning Activities:

- Ability to identify key features of graphs and tables including: intercepts; intervals where the function is increasing/decreasing, positive/negative; relative maximum/minimum; symmetries; end behavior
- Ability to graph exponential and logarithmic functions and identify the key features
- Ability to identify the rate of change of exponential and logarithmic functions
- Ability to utilize the laws of logarithms to rewrite and evaluate
- Ability to continue with idea of inverse from the previous unit to understand logarithmic functions as being inverse functions of exponential functions

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POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES: Teacher directed differentiated instructional projects and activities are ongoing and based on student need.	
ENRICHMENT:	**REMEDIATION:**

• Pearson SuccessNet On-Line Teacher's Edition
• Pearson on-line resources and materials
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• Web-based Math Resources
• Small group instruction
• Teacher generated/differentiated instruction enrichment and activities
• Supporting the range of learners as per teacher manual
• Encourage and support learners in explaining how they applied their skills during mathematical tasks
• http://www.artofproblemsolving.com/liz/Alcumus/index.php
• Enrichment based on student GIEP or need of student
	• Pearson Successnet On-Line Teacher's Edition
	• Pearson on-line resources and materials
	• Web-based Math Resources
	• Supporting the range of learners as per teacher manual
	• Teacher generated/differentiated instruction activities
	• Small group instruction
	• Adapted assignments
	• Additional time
	• Alternative Assessments
	• Chunking of content, assignment and/or assessments
	• One-on-one re-teaching
	• Volunteer/peer tutoring
	• Accommodations based on IEP and/or need
	• ELL student(or based on student need) additional support
	    o Provide specific examples
	    o Use of Manipulatives
	    o Simplified language in word problems
	    o Visuals
	    o Flashcards
	    o Multiple-meaning words
	    o Bilingual dictionary/picture dictionary
	• Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:	- Pearson Algebra II: Unit: 5 - Prentice Hall Algebra II: Unit: 8 - PDE SAS portal: http://www.pdesas.org - Thinking Maps - Graphing calculator - Exit Tickets - Adaptions checklist - ELL Instructional Strategies for Math - ESL Resources - Click on "Academic" from PMSD website - Click on "English Language Arts" on left side of tool bar. - Click on the link for ESL - Click on Teacher - Teacher generated/differentiated instruction resources and activities - Algebra II released state sample questions - Algebra II generated sample questions - Promethean Flipcharts/ActiVotes - Math flipcharts - Math Internet Resources from PMSD Resource Page - USA Test Prep - Dan Meyer's videos by standard - http://www.khanacademy.org/ - Thinkfinity website: http://www.thinkfinity.org/home - IXL Website: http://www.IXL.com/math/ - United Streaming: http://streaming.discoveryeducation.com/index.cfm - http://edhelper.com/place_value.html - http://illuminations.nctm.org - http://insidemathematics.org - www.teachingchannel.org - www.Learnzillion.com - http://illustrativemathematics.org/standards/k8 - http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/ - www.teachingchannel.org - http://www.learnzillion.com - http://www.teacherspayteachers.com - flexmath.ck12.org/ - http://schools.nyc.gov (engage NY) - http://www.cde.ca.gov/ci/ma/cf/documents/aug2013 algebra2.pdf - http://www.geogebra.org/coms/download

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra: Grades 11 - 12	Unit 4:	Radical and Rational Functions	TIME FRAME:	35 days

NATIONAL COMMON CORE STANDARDS:

Creating Equations
- **A.CED.1** Create equations in one variable and use them to solve problems. Include simple rational functions.

Reasoning with Equations and Inequalities
- **A.REI.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Building Functions
- **F.BF.1b** Combine standard function types using arithmetic operations.

Interpreting Functions
- **F.IF.5** Relate the domain of a function to its graph.

Seeing Structure in Expression
- **A.SSE.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity.
- **A.SSE.2** Use the structure of an expression to identify ways to rewrite it.

The Real Number System
- **N.RN.1** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radical in terms of rational exponents.
- **N.RN.2** Rewrite expressions involving radicals and rational exponents using properties of exponents.

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

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
• **What are the key features of the graphs of radical and rational functions?** • **How can functions be manipulated to make new functions?** • **How do you solve a radical equation?** • **How do you solve an equation with rational exponents?** • **How do you solve a rational equation?** • **How do you simplify radical**	Fractional Integer Radical Ratio Rational	**Formative:** • Journals/logs • KWL chart • At the bell activities • Question and answer • Individual white boards/Promethean Board ActiVotes • Homework • Quizzes • Constructed response/open-ended problem solving • Performance tasks • Exit slips

expressions?		**Summative:**
		• CDT's
		• Performance based assessments
		o Quizzes
		o Tests
		o Constructed response/open-ended problem solving
		o Performance tasks
		o Project

UNIT OF INSTRUCTION: College Algebra: Radical and Rational Functions

PA CORE STANDARDS

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational expressions.

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.

CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.

CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms.

CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.

CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems.

Essential Understandings/Learning Activities:
- Ability to identify domain and range.
- Ability to solve equations and identify extraneous solutions (solutions will be expressed in interval notation).
- Ability to build new functions from old.
- Ability to represent a function in more than one way.
- Ability to graph square and cube roots.

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES: Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:

- Pearson SuccessNet On-Line Teacher's Edition
- Pearson on-line resources and materials
- USA Test Prep
- Web-based Math Resources
- Small group instruction
- Teacher generated/differentiated instruction enrichment and activities
- Supporting the range of learners as per teacher manual
- Encourage and support learners in explaining how they applied their skills during mathematical tasks
- http://www.artofproblemsolving.com/liz/Alcumus/index.php
- Enrichment based on student GIEP or need of student

REMEDIATION:

- Pearson Successnet On-Line Teacher's Edition
- Pearson on-line resources and materials
- Web-based Math Resources
- Supporting the range of learners as per teacher manual
- Teacher generated/differentiated instruction activities
- Small group instruction
- Adapted assignments
- Additional time
- Alternative Assessments
- Chunking of content, assignment and/or assessments
- One-on-one re-teaching
- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
  - Provide specific examples
  - Use of Manipulatives
  - Simplified language in word problems
  - Visuals
  - Flashcards
  - Multiple-meaning words
  - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:

- Pearson Algebra II: Unit 4
- Prentice Hall Algebra II: Units: 7, 9
- PDE SAS portal: http://www.pdesas.org
- Thinking Maps
- Graphing calculator
- Exit Tickets
- Adaptions checklist
- ELL Instructional Strategies for Math
- ESL Resources
    - o Click on "Academic" from PMSD website
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    - o Click on Teacher
- Teacher generated/differentiated instruction resources and activities
- Algebra II released state sample questions
- Algebra II generated sample questions
- Promethean Flipcharts/ActiveVotes
- Math flipcharts
- Math Internet Resources from PMSD Resource Page
- USA Test Prep
- Engage NY
- Geogebra
- http://www.khanacademy.org/
- Thinkfinity website: http://www.thinkfinity.org/home
- IXL Website: http://www.IXL.com/math/
- United Streaming: http://streaming.discoveryeducation.com/index.cfm
- http://edhelper.com/place_value.html
- http://illuminations.nctm.org
- http://insidemathematics.org
- www.teachingchannel.org
- www.Learnzillion.com
- http://illustrativemathematics.org/standards/k8
- http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
- www.teachingchannel.org
- http://www.learnzillion.com
- http://www.teacherspayteachers.com
- flexmath.ck12.org/
- http://www.cde.ca.gov/ci/ma/cf/documents/aug2013algebra2.pdf

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra: Grades: 11 - 12	Unit 5:	Basic Trigonometry	TIME FRAME:	30 days

NATIONAL COMMON CORE STANDARDS:

Building Functions
- **F.BF.1b** Combine standard function types using arithmetic operations.

Trigonometric Functions
- **F.TF.9** Prove the addition and subtraction formulas for sine, cosine, and tangent and
  use them to solve problems.
- **F.TF.7** 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.

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

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
How do you evaluate trigonometric functions for given values? **How do we model "real world" scenarios to trigonometric functions?** **How can inverse trigonometric functions be used to solve "real world" scenarios?**	Trigonometric functions Radian Pi Angles Pythagorean theorem	**Formative:** - Journals/logs - KWL chart - At the bell activities - Question and answer - Individual white boards/Promethean Board ActiVotes - Homework - Quizzes - Constructed response/open-ended problem solving - Performance tasks - Exit slips **Summative:** - CDT's - Performance based assessments - Quizzes - Tests - Constructed response/open-ended problem solving - Performance tasks - Project

PA CORE STANDARDS	
CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. **CC.2.2.HS.C.7** Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. **CC.2.2.HS.C.8** Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. **CC.2.2.HS.C.9** Prove the Pythagorean identity and use it to calculate trigonometric ratios. **CC.2.2.HS.D.9** Use reasoning to solve equations and justify the solution method. **CC.2.2.HS.D.2** Write expressions in equivalent forms to solve problems. **Essential Understandings/Learning Activities:** • Ability to interpret values based on trigonometric functions. • Ability to understand and apply inverse trigonometric functions in solving equations and real-life situations.	

UNIT OF INSTRUCTION: Basic Trigonometry

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:
Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:

- Pearson SuccessNet On-Line Teacher's Edition
- Pearson on-line resources and materials
- USA Test Prep
- Web-based Math Resources
- Small group instruction
- Teacher generated/differentiated instruction enrichment and activities
- Supporting the range of learners as per teacher manual
- Encourage and support learners in explaining how they applied their skills during mathematical tasks
- http://www.artofproblemsolving.com/liz/Alcumus/index.php
- Enrichment based on student GIEP or need of student

REMEDIATION:

- Pearson Successnet On-Line Teacher's Edition
- Pearson on-line resources and materials
- Web-based Math Resources
- Supporting the range of learners as per teacher manual
- Teacher generated/differentiated instruction activities
- Small group instruction
- Adapted assignments
- Additional time
- Alternative Assessments
- Chunking of content, assignment and/or assessments
- One-on-one re-teaching
- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
  - Provide specific examples
  - Use of Manipulatives
  - Simplified language in word problems
  - Visuals
  - Flashcards
  - Multiple-meaning words
  - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:

- Pearson Algebra II: Unit: 8
- Prentice Hall Algebra II: Unit: 14
- PDE SAS portal: http://www.pdesas.org
- Thinking Maps
- Graphing calculator
- Exit Tickets
- Adaptions checklist
- ELL Instructional Strategies for Math
- ESL Resource
    - Click on "Academic" from PMSD website
    - Click on "English Language Arts" on left side of tool bar.
    - Click on the link for ESL
    - Click on Teacher
- Teacher generated/differentiated instruction resources and activities
- Algebra II released state sample questions
- Algebra II generated sample questions
- Promethean Flipcharts/ActiveVotes
- Math flipcharts
- Math Internet Resources from PMSD Resource Page
- USA Test Prep
- Engage NY
- Geogebra
- http://www.khanacademy.org/
- Thinkfinity website: http://www.thinkfinity.org/home
- IXL Website: http://www.IXL.com/math/
- United Streaming: http://streaming.discoveryeducation.com/index.cfm
- http://edhelper.com/place_value.html
- http://illuminations.nctm.org
- http://insidemathematics.org
- www.teachingchannel.org
- www.Learnzillion.com
- http://illustrativemathematics.org/standards/k8
- http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
- www.teachingchannel.org
- http://www.learnzillion.com
- http://www.teacherspayteachers.com
- flexmath.ck12.org/

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

College Algebra: Grades: 11 - 12	Unit 6:	Data Analysis/Probability	TIME FRAME:	25 days

NATIONAL COMMON CORE STANDARDS:

Interpreting Categorical and Quantitative Data
- **S.ID.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- **S.ID.4** Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Conditional Probability and the Rules of Probability
- **S.CP.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
- **S.CP.2** Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- **S.CP.3** Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
- **S.CP.6** Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
- **S.CP.7** Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.
- **S.CP.8** (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
- **S.CP.9** (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

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

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT
How do you find simple and compound probability? **How do you find conditional probability?** **What are some different ways of representing data?** **How do you find the standard deviation of a data set?** **How do you analyze binomial and normal distribution?** **How do you determine the number of permutations and/or combinations of an event?**	Arithmetic Binomial Distribution Box and Whisker Plots Geometric Interquartile Range Margin of Error Measures of central tendency Normal Distribution Odds Probability Quartiles Sample Standard Deviation	**<u>Formative:</u>** - Journals/logs - KWL chart - At the bell activities - Question and answer - Individual white boards/Promethean Board ActiVotes - Homework - Quizzes - Constructed response/open-ended problem solving - Performance tasks - Exit slips **<u>Summative:</u>** - CDT's - Performance based assessments - Quizzes - Tests - Constructed response/open-ended problem solving - Performance tasks - Project

POCONO MOUNTAIN SCHOOL DISTRICT CURRICULUM

<table>
<tr><td rowspan="2">UNIT OF INSTRUCTION:
Data Analysis/Probability</td><td colspan="2">PA CORE STANDARDS</td><td></td></tr>
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CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.

CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.

CC.2.4.HS.B.4 Recognize and evaluate random processes underlying statistical experiments.

CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.

CC.2.4.HS.B.6 Use the concepts of independence and conditional probability to interpret data.

CC.2.4.HS.B.7 Apply the rules of probability to compute probabilities of compound events in a uniform probability model.

Essential Understanding/Learning Activities
- Ability to find, convert, and/or compare probability and/or odds of a simple event.
- Ability to use probability to predict outcomes.
- Ability to analyze data and/or answer questions based on data displays.
- Ability to use measures of central tendency to describe a set of data.
- Ability to find probabilities for independent, dependent, or compound events and represent as a fraction or percent.
- Ability to find the standard deviation of a set of values.
- Ability to find sample proportions and margin of error.
- Ability to find binomial probabilities and use binomial distributions.
- Ability to use a normal distribution.

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	DIFFERENTIATION ACTIVITIES: Teacher directed differentiated instructional projects and activities are ongoing and based on student need.	
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		- Pearson Successnet On-Line Teacher's Edition - Pearson on-line resources and materials - Web-based Math Resources - Supporting the range of learners as per teacher manual - Teacher generated/differentiated instruction activities - Small group instruction - Adapted assignments - Additional time - Alternative Assessments - Chunking of content, assignment and/or assessments - One-on-one re-teaching - Volunteer/peer tutoring - Accommodations based on IEP and/or need - ELL student(or based on student need) additional support - Provide specific examples - Use of Manipulatives - Simplified language in word problems - Visuals - Flashcards - Multiple-meaning words - Bilingual dictionary/picture dictionary - Math Support, Learning Support, or ELL Teachers as appropriate and based on need

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