**Subject : Algebra II - CURRICULUM MAP**

|  |
| --- |
| **UNIT ONE** |
| **TOPIC** | **Equations & Inequalities/Review Operations on Polynomials – 10 days** |
| **ESSENTIAL QUESTIONS** | Why are there two cases when solving an absolute value equation or inequality?Explain whether or not every equation or expression is factorable?Why are graphs important in modeling real world situations? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Factor polynomial*****Expressions*** **Absolute value equations and inequalities**  | Factorization using an combination of the following techniques: common factor extraction, difference of two perfect squares,Choose an effective approach to solve a problem from a variety of strategies (graphic & algebraic)involving linear expressions in one variablePresent organized mathematical ideas with the use of proper notations, including the use of symbols and other representations when sharing an idea in verbal and written formIdentify regions in the half plane from absolute value inequalities. | **A-SSE.1** Interpret expressions that represent a quantity in terms of its context.a. Interpret parts of an expression, such as terms, factors, and coefficients. b. 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.* **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-REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.  |
| **Reason quantitatively and use units to solve problems.****Define appropriate quantities for the purpose of descriptive modeling.****Perform arithmetic operations with complex numbers** | .  | **N-CN.1** Know there is a complex number i such that i2 = –1, and every complex number has the form : a + bi with a and b real.**N-CN.2** Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.Use complex numbers in polynomial identities and equations. **N-CN.7** Solve quadratic equations with real coefficients that have complex solutions.Interpret the structure of expressions**A-SSE.2** Use the structure of an expression to identify ways to rewrite it. For example,  see x4– y4 as (x2-y2)(x2+y2), thus recognizing it as a difference of squares that can be factored as a difference of squares that can be factored further.Understand the relationship between zeros and factors of polynomials.**A-APR.2** Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder  |
| **Standards of Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoningMaking sense of problems Model with mathematics Reason abstractly and quantitatively  |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment  Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculatorsAlgebra Tiles and other manipulativesSmart Board DemonstrationsProblem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack<http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT TWO** |
| **TOPIC** |  **Rational Expressions – 10 days** |
| **ESSENTIAL QUESTIONS** | When is a rational expression undefined?Why do we need a common denominator when we add or subtract, but not when we multiply or divide?When is cross multiplying an appropriate method to solve a rational equation? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Solve systems ofequations** **Rewrite rational expressions** **Understand solving equations as a process of reasoning and explain the reasoning**  | Perform arithmetic operations with polynomialExpressions containing rational coefficientsPerform arithmetic operations with rational expressions and rename to lowest termsSimplify Complex fractional expressionsSolve rational equations and inequalitiesRecognize and understand equivalentrepresentations of a problem situation or a mathematic conceptUnderstand the corresponding procedures forsimilar problems or mathematical concepts | **A-APR.6** Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. **A-APR.7** (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. **A-REI.2** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.  |
| **Extend the properties of exponents to rational exponents.****Re Reason quantitatively and use units to solve problems.****Define appropriate quantities for the purpose of descriptive modeling.** |  | 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 radicals in terms of rational exponents.N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. N-Q.2 Define appropriate quantities for the purpose of descriptive modeling |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT THREE** |
| **TOPIC** |  **Radicals – 8 days** |
| **ESSENTIAL QUESTIONS** | Why is the product of a conjugate pair always a rational number?How do you know that an expression is in simplest radical form?Why do radicals need to have like radicands?Why are some solutions to a radical equation extraneous? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Interpret the structure of expressions** **Write expressions in equivalent forms to solve problems**  | Simplify radical expressions Perform addition, subtraction, multiplication, and division of radical expressionsRationalize denominators involving algebraic radical expressionsPerform operations (addition, subtraction, multiplication, and division) with expressions containing irrational numbers in radical formRationalize a denominator with a radical expressions | **A-SSE.1** Interpret expressions that represent a quantity in terms of its context.a. Interpret parts of an expression, such as terms, factors, and coefficients. b. 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. **A-SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12 t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT Four** |
| **TOPIC** |  **Relations & Functions – 11 days** |
| **ESSENTIAL QUESTIONS** | How are the domain and range related to the coordinate plane?How does a functions and its inverse relate to each other?How do direct variation and inverse variation differ? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Analyze functions using different representations** **Build new functions from existing functions** **Analyze functions using different representations** **Understand the concept of a function and use function notation** **Build a function that models a relationship between two quantities**  | Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. Define a relation and function.Determine when a relation is a function.Determine the domain and range of a function from its equation.Determine the domain and range of a function from its graph.Identify relations and functions, using graphs.Write functions in functional notationUse functional notation to evaluate functions for given values in the domain.Use multiple representations to represent and explain problem situations (verbally, numerically, algebraically, graphically)Communicate logical arguments clearly, showing why a result makes sense and why the reasoning is valid | **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-BF.3** 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. **F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **F-IF.1** 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 f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). **F-BF.1** Write a function that describes a relationship between two quantities.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT Five** |
| **TOPIC** |  **Quadratic Functions & Complex Numbers – 10 days** |
| **ESSENTIAL QUESTIONS** | How would you relate the discriminate, the nature of the roots, and the graph of the parabola?How do you determine the most appropriate method for solving a given equation? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Write expressions in equivalent forms to solve problems** **Solve equations and inequalities in one variable** **Analyze functions using different representations** **Create equations that describe numbers or relationships**  | Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form *(x – p) 2 = q* Solve quadratic equations by inspection (e.g., for x*2* = 49), taking square roots, completing the square, the quadratic formula and factoring. Know and apply the technique of completing the square.Solve quadratic equations, using the quadratic formula.Use the discriminant to determine the nature of the roots of a quadratic equation.Solve systems of equations involving linear equations and quadratic equations algebraically.Determine the sum and product of the roots of a quadratic equation by examining its coefficients.Determine the quadratic equation, given the sum and product of its roots. Perform arithmetic operations (addition, subtraction, multiplication, division) with expressions containing irrational numbers in radical form.Perform arithmetic operations on irrational expressions.Write square roots of negative numbers in terms of *i.*Simplify powers of *i*.Determine the conjugate of a complex number.Perform arithmetic operations on complex numbers and write the answer r in the form *a* + *bi*. |  **A-SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.c. Use the properties of exponents to transform expressions for exponential functions.**F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **A-REI.4** Solve quadratic equations in one variable. **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.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT Six**  |
| **TOPIC** |  **Solving Higher Degree Equations & Systems of Equations – 5 days** |
| **ESSENTIAL QUESTIONS** | . What is the connection between the degree of the polynomial and the number of factors?How do you represent factors of a polynomial graphically?What does a solution to a system mean? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Write expressions in equivalent forms to solve problems** **Solve equations and inequalities in one variable** **Analyze functions using different representations** **Create equations that describe numbers or relationships** **Solve systems of equations**  | .Solve Quadratic Inequalities in one and twovariables, algebraically and graphically Find the solution to polynomial equations of higher degree that can be solved using factoring and/or the quadratic formula.Approximate the solution to polynomial equations of higher degree by inspecting the graph. Solve systems of equations involving one linear equation and one quadratic equation algebraically.  This includes rational equations that result in linear equations with extraneous roots.Determine information required to solvethe problem, choose methods for obtaining the information, and define parameters for acceptable solutions.Select appropriate representations to solve problem situations. | **A-SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.c. Use the properties of exponents to transform expressions for exponential functions.**F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **A-REI.4** Solve quadratic equations in one variable. **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-REI.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x2 + y2 = 3. . **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.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT SEVEN** |
| **TOPIC** |  **Sequences & Series - 10 days** |
| **ESSENTIAL QUESTIONS** | How does recognizing patterns assist in the prediction of future events?What advantages are there to the explicit formula versus the recursive formula? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Build a function that models a relationship between two quantities** **Understand the concept of a function and use function notation** **Write expressions in equivalent forms to solve problems**  | Know and apply sigma notation.Identify an arithmetic or geometric sequence and find the formula for its nth term.Determine the common difference in an arithmetic sequence.Determine the common ratio in a geometric sequence.Determine a specified tem of an arithmetic or geometric sequence.Specify terms of a sequence, given its recursive definition.Represent the sum of a series, using sigma notation. Determine the sum of the first n terms of an arithmetic or geometric series. Observe and explain patterns to formulate generalizations and conjectures.Apply inductive reasoning in making and supporting mathematical conjectures. |  **F-BF.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms**F-IF.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. **F-BF.1** Write a function that describes a relationship between two quantities.a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. 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**A-SSE.4** Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT EIGHT** |
| **TOPIC** |  **Exponential functions – 8 days** |
| **ESSENTIAL QUESTIONS** | How can exponential growth and decay be modeled?How is solving exponential and logarithmic equations used in real-world situations? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Interpret functions that arise in applications in terms of the context** **Analyze functions using different representations**  | Evaluate numerical expressions with negative and/or fractional exponents, without the aid of a calculator (when the answers are rational numbers).Apply the rules of exponents to simplify expressions involving negative and/or fractional exponents.Rewrite algebraic expressions that contain negative exponents using only positive exponents.Rewrite algebraic expressions with fractional exponents as radical expressions.Rewrite algebraic expressions in radical form as expressions with fractional exponents.Evaluate exponential expressions, including those with base *e*.Graph exponential functions of the form y = b*x* forpositive values of b including b = e, Solve exponential equations with or without common bases |  **F-IF.4** 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.**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.e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. **F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT NINE** |
| **TOPIC** |  **Unit: Logarithmic Functions – 15 days** |
| **ESSENTIAL QUESTIONS** | How are the properties of logs related to the properties of exponents?How do you recognize when to use logarithms to solve an equation?What is the line of reflections between a logarithmic function and its inverse? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Build new functions from existing functions** **Analyze functions using different representations** **Construct and compare linear, quadratic, and exponential models and solve problems**  | Solve a logarithmic equation byrewriting as an exponential equation.Graph log functions, using the inverse of the related exponential function.Evaluate log expressions in any base.Apply the properties of logs to rewrite log expressions in equivalent forms.Solve a log equation by rewriting as an exponential equation.Solve an application which results in an exponential function.Solve exponential equations with and without common bases. |  **F-BF.4** Find inverse functions. a. Solve an equation of the form f(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. **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. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.  **F-LE.4** For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT TEN** |
| **TOPIC** |  **Unit: Trigonometric Functions – 15 days** |
| **ESSENTIAL QUESTIONS** | How is trigonometry used to solve real-world problems in engineering and science?What are the relationship s between the special right triangles and the unit circle? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Define trigonometric ratios and solve problems involving right triangles** **Extend the domain of trigonometric functions using the unit circle**  | Sketch the unit circle and represent angles in standard position.Express and apply the six trig functions as ratios of the sides of a right triangle.Know the exact and approximate values of the sine, cosine, and tangent of 0°, 30°, 45°, 60°, 90°,180°, and 270° angles.Sketch and use the reference angle for angles in standard position (for the unit circle).Define radian measure.Convert between radian and degree measures.Find the value of trig functions, if given a point on the terminal side of angle J (as located on the unit circle).Use inverse functions to find the measure of an angle, given its sine, cosine, or tangentKnow and apply the co-functions andreciprocal relationships between trig ratios.Use the reciprocal and co- function relationships to find the value of the secant, cosecant, and cotangent of 0°, 30°, 45°, 60°, 90°, 180°, and 270° angles.Find the value of trig functions, if given a point on the terminal side of angle θ.Use inverse functions to find the measure of an angle, given its sine, cosine, or tangentDetermine the length of an arc of a circle,given its radius and the measure of its central angle. |  **G-SRT.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. **F-TF.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. **F-TF.2** 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. **G-SRT.7** Explain and use the relationship between the sine and cosine of complementary angles.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT ELEVEN** |
| **TOPIC** |  **Unit: Graphs of Trigonometric Functions – 10 days** |
| **ESSENTIAL QUESTIONS** | How does the unit circle relate to the sine and cosine curves?How can we relate transformations to variations in trigonometric graphs? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Build new functions from existing functions** **Prove and apply trigonometric identities**  | Sketch and recognize one cycle of a function of the form: y = A sin Bx or y = A cos Bx.Write the trig function that is represented by a given periodic graph.Restrict the domain of the sine, cosine, and tangent functions to ensure the existence of an inverse function.Sketch the graph of the inverses of the sine, cosine, and tangent functions.Determine the trig. Functions of any angle using tech.Sketch and recognize the graphs of the functions y = sec(x), y = csc(x), y = tan(x),y = cot(x).Justify the Pythagorean identities. |  **F-BF.3** 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. **F-TF.8** Prove the Pythagorean identity sin2(Θ) + cos2(Θ) = 1 and use it to find sin(Θ), cos(Θ), or tan(Θ) given sin(Θ), cos(Θ), or tan(Θ) and the quadrant of the angle. **F-TF.9** (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT TWELVE** |
| **TOPIC** |  **Unit: Trigonometric equations – 5 days** |
| **ESSENTIAL QUESTIONS** | How do you know when and what to substitute in order to solve a trig equation? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Model periodic phenomena with trigonometric functions**  | Use inverse functions to find the measure of an angle, given its sine, cosine, or tangent.Solve trig equations for all values of the variable from 0° to 360° |  **F-TF.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.**F-TF.8** Prove the Pythagorean identity sin2(Θ) + cos2(Θ) = 1 and use it to find sin(Θ), cos(Θ), or tan(Θ) given sin(Θ), cos(Θ), or tan(Θ) and the quadrant of the angle.  |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT THIRTEEN** |
| **TOPIC** |  **Unit: Statistics – 13 days** |
| **ESSENTIAL QUESTIONS** | What are the different statistical tools that can be used to collect and analyze data?What are some valid ways to use statistics and what are some non-valid ways to use statistics?How is the normal distribution curve used as a predictor of outcomes? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Make inferences and justify conclusions from sample surveys, experiments, and observational studies** **Summarize, represent, and interpret data on a single count or measurement variable** **Summarize, represent, and interpret data on two categorical and quantitative variables** **Interpret linear models**  | Calculate measures of central tendency with groupfrequency distributions.Calculate measures of dispersion (range, quartiles,interquartile range, standard deviation, and variance) for both samples and populations.Understand the differences among various kinds of studies (e.g., survey, observation, controlled experiment).Determine factors which may affect the outcome of a survey.Know and apply the characteristics of thenormal distribution.Use the normal distribution as an approximation for binomial probabilities.Determine from a scatter plot whether a linear, logarithmic, exponential, or power regression model is most appropriate.Determine the function of a regression modelInterprete within the regression model |  **S-IC.6** Evaluate reports based on data**S-ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).**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.5** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data**S-ID.8** Compute (using technology) and interpret the correlation coefficient of a linear fit. |
| **Mathematical Practices :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |

**Subject : Algebra II - Trigonometry**

|  |
| --- |
| **UNIT FOURTEEN** |
| **TOPIC** |  **Unit: Probability - 10 days** |
| **ESSENTIAL QUESTIONS** | What is the difference between empirical probability and theoretical probability?What is binomial probability and for what situations is the binomial probability formula useful?How can the number of elements in a sample space be generatd using permutations, combinations, and theFundamental Principle of Counting?In what other way could you determine the probability of at least or at most using the fact that the probability ofcertainty is one?When would you use a permutation versus a combination in real life situation?How does the formula for combinations relate to solving permutations with identical objects? |
| **CONTENT** | **SKILLS:** | **COMMON CORE STANDARDS** |
| **Understand independence and conditional probability and use them to interpret data** **Use the rules of probability to compute probabilities of compound events in a uniform probability model** **Use the rules of probability to compute probabilities of compound events in a uniform probability model**  | Calculate theoretical probabilities, including geometric applications. Calculate empirical probabilities.Know and apply the binomial probability formula toevents involving the terms exactly, at least, at most.Apply the binomial theorem to expand a binomial and determine a specific term of a binomial expansion.Differentiate between situations requiring permutations and those requiring combinations.Calculate the number of possible permutations of n terms taken r at a time. Calculate the number of possible combinations (nCr) of n items taken r at a time.Use permutation, combinations, and theFundamental Principle of counting to determinethe number of elements in a sample pace and aspecific subset (event). |  **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.4** Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.**S-CP.5** Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer**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 :**Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning Reason abstractly and quantitativelyMake sense of problems and persevere in solving them Construct viable arguments and critique the reasoning of others |
| **ASSESSMENTS**ConferencingPre and Post TestsOpen-ended problems that involve a discovery approach to collaborative learning Lead up problem solving tasks Performance Based Assessment Daily student work Student/group presentations |
| **MATERIALS & RESOURCES** | Text book : Meaningful Mathematics – Geometry Prentice Hall Mathematics Algebra IGraphing calculators Algebra Tiles and other manipulativesSmart Board Demonstrations Problem solving materials created by teachers“Reality In Mathematics Education” Lesson Pack <http://nrich.maths.org/frontpage>[www.Jmap.org](http://www.Jmap.org) |