Archdiocese of Newark Catholic Schools

Curriculum Mapping

Curriculum mapping is a process that helps schools and districts/dioceses determine the “agreed-upon” learning for all students. Curriculum mapping was undertaken in the Archdiocese of Newark in order to ensure that a consistent, clearly articulated curriculum infused with Gospel values is being provided to all students in our schools. The curriculum maps for the Catholic schools of the Archdiocese of Newark identify the content to be taught and skills to be mastered at each grade level.

The expertise and experience of the educators within our schools is the main source for determining the content and skills students will be expected to master. The Archdiocesan curriculum maps are developed through a collaborative process which involves individual teacher contributions, small group sessions and larger group meetings. Relevant educational standards, including those proposed by content area experts, the New Jersey Core Curriculum Content Standards, and the Common Core State Standards, are used as a resource in the curriculum mapping process. The resulting consensus maps reflect the collective thinking of classroom teachers based on their observation of student learning and their knowledge of educational practice and research. The Archdiocesan curriculum maps include teacher generated ideas for the infusion of Gospel values and faith connection activities.

While the curriculum maps clearly articulate the expected learning for all students, individual teachers have the flexibility to teach the content and skills in their own manner by:

- utilizing their own particular strengths and teaching style
- addressing the varying learning needs of their students
- determining the order in which the content and skills are presented within a marking period
- including additional content and skills once students have met the learning expectations identified in the curriculum map

Administrators at all levels will maintain the responsibility to ensure that teachers are following the curriculum maps and that appropriate teaching is being conducted. This will be done through a combination of classroom observations, faculty meetings, professional development opportunities and teacher evaluations, as well as by using various measurement tools, including but not limited to in-class and standardized testing. The Archdiocesan curriculum maps will help ensure the academic excellence that is integral to the mission of our Catholic schools and will provide educators and parents with a clear understanding of the learning expectations at each grade level.

High School Algebra 2
July 2014

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
This curriculum map reflects the general expectations of student learning in Algebra 2 at the high school level. Each school will determine the course-specific expectations based on the level of the course or courses offered. Schools will also determine the sequence in which the various topics are taught within the specific course.				
N.Q.1 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. N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. 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.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	*Items marked with an asterisk (*) are considered optional.* **Real Numbers and Operations** **Algebraic Expressions**	*Items marked with an asterisk (*) are considered optional.* Identify and apply the properties of real numbers. Evaluate expressions by using order of operations. Evaluate and simplify algebraic expressions. Translate verbal statements into mathematical expressions.	Student learning will be assessed on a continual basis using various types of formal and informal assessments. A list of possible assessment methods is provided below: Tests Quizzes Projects Homework Classwork Student presentations Observation of student work Critical thinking activities Performance Tasks Online Programs Class participation Mid-term exams Final exams	Gospel values should be evident in the classroom environment and referenced and reinforced throughout the curriculum. **Gospel Values** Community Compassion Faith in God Forgiveness Hope Justice Love Peace Respect For Life Service Simplicity Truth Teachers will also highlight elements of Catholic identity that can be related to topics in the Math curriculum.

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. 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.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*. A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R*. F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	**Linear Equations** **Linear Inequalities** **Absolute Value Equations**	Solve linear equations and assess their solutions. Rewrite equations and formulas. Model linear equations to solve real world problems. Solve simple and compound linear inequalities Graph linear inequalities on a number line Solve absolute value equations Model absolute value equations to solve real world problems.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
A.CED.1 & A.CED.3: See page 2	**Absolute Value Inequalities**	Solve absolute value inequalities. Model absolute value inequalities to solve real world problems		
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.3 *See page 2.* 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.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	**Direct Variation**	Write and interpret direct variation equations. Graph direct variation equations.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
The following standard statements can be found in previous sections: *N.Q.1:See page 1* *A.CED.2: See page 3* *A.CED.3: See page 2* *F.IF.7& 7a: See page 3* 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.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. 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*.	**Introduction to Functions**	Differentiate a function from a relation. Identify a function using vertical line test. Identify domain and range of a function. Evaluate functions using function notation. Representing functions and relations using mapping diagrams, table of values and graphs.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). *The following standard statements can be found in previous sections:* *A.CED.2:See page 3* *A.CED.3: See page 2* *F.IF.1: See page 4* *F.IF.2: See page 4* *F.IF.4: See page 4* *F.IF.5: See above* *F.IF.6: See page 3* *F.IF.7& 7a: See page 3* *F.IF.7b: See page 2* A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**Linear Functions**	Classifying slopes of lines. Calculate slope using slope formula. Graph lines using slope intercept form and standard form of equation. Find x and y intercepts. Graph vertical and horizontal lines. Interpret a rate of change from a slope.		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester

Standards	Content	Skills	Assessment	Gospel Values
A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. S.ID.6c Fit a linear function for a scatter plot that suggests a linear association. S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. F.BF.1 Write a function that describes a relationship between two quantities.		Use slope to solve real world problems. Compare two given lines and conclude whether they are parallel, perpendicular or neither. Compare steepness of slopes. Write equations of lines. Graph linear inequalities in two variables. Model real world problems using linear functions. *Find the equation of the best fit line given a dataset. *Graph piecewise functions		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester

Standards	Content	Skills	Assessment	Gospel Values
F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context. 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.LE.2 *See page 5.* F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context. G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).				

First Semester

Standards	Content	Skills	Assessment	Gospel Values
The following standard statements can be found in previous sections: *A.CED.2: See page 3* *A.CED.3: See page 2* *A.REI.10; See page 5* *A.REI.12: See page 6* A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. 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.	**Systems of Equations**	Solve a system of linear equations by graphing, substitution and linear combinations. Model and solve real world problems using systems. Solve and graph system of linear inequalities. *Solve systems of three variable equations. *Use linear programming to solve real world problems.		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester

Standards	Content	Skills	Assessment	Gospel Values
The following standards can be found in previous sections: *F.IF.7b: See page 3* *F.BF.3 See page 7*	**Absolute Value Functions** *(Semester placement varies)*	Graph absolute value functions. Perform transformations on absolute value functions.		
The following standards can be found in previous sections: *N.Q.1:See page 1* *N.Q.2: See page 1* *A.CED.1: See page 2* *A.CED.2: See page 3* *A.CED.3: See page 2* *A.REI.1: See page 1* *A.REI.10: See page 5* *A.REI.11: See page 8* *F.IF.1: See page 4* *F.IF.2: See page 4* *F.IF.4: See page 4* *F.IF.5: See page 5* *F.IF.7& 7a: See page 3* *F.BF.3: See page 7* A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	**Quadratic Functions** *(Semester placement varies)*	Simplify radicals. Graph quadratic functions using vertex form, standard form and intercept form. Identify the key parts of a parabola. Solve a quadratic equation by factoring, finding square root, completing the square and using the quadratic formula. Convert a quadratic function in standard form into vertex form.		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester

Standards	Content	Skills	Assessment	Gospel Values
A.REI.4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b. 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 $x^2 + y^2 = 3$. A.SSE.2 Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.* A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.		Use the discriminant to determine the nature of the roots of a quadratic equation. Solve real life applications involving maximizing revenue, and height and distance of an object.		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
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. A.APR.4 Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.* F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. 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. 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. F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*				

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

First Semester

Standards	Content	Skills	Assessment	Gospel Values
N.CN.7 Solve quadratic equations with real coefficients that have complex solutions. 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.3 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. N.CN.4 Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	**Complex Numbers** *(Semester placement varies)*	Add, subtract, multiply and divide complex numbers. *Graph complex numbers		

Archdiocese of Newark Catholic Schools Curriculum Map for High School Algebra 2				
First Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
N.VM.6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network. N.VM.8 Add, subtract, and multiply matrices of appropriate dimensions. 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.	***Matrices**	*Perform basic matrix operations. *Use matrices to solve system of linear equations.		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
A.SSE.3c Use the properties of exponents to transform expressions for exponential functions. *For example the expression* 1.15^t *can be rewritten as* $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* 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. *For example, we define* $5^{1/3}$ *to be the cube root of 5 because we want* $(5^{1/3})^3 = 5^{(1/3)3}$ *to hold, so* $(5^{1/3})^3$ *must equal 5.*	*Items marked with an asterisk (*) are considered optional.* **Properties of Exponents**	*Items marked with an asterisk (*) are considered optional.* Evaluate and simplify expressions of powers using the properties of exponents.	Student learning will be assessed on a continual basis using various types of formal and informal assessments. A list of possible assessment methods is provided below: Tests Quizzes Projects Homework Classwork Student presentations Observation of student work Critical thinking activities Performance Tasks Online Programs Class participation Mid-term exams Final exams	Gospel values should be evident in the classroom environment and referenced and reinforced throughout the curriculum. **Gospel Values** Community Compassion Faith in God Forgiveness Hope Justice Love Peace Respect For Life Service Simplicity Truth Teachers will also highlight elements of Catholic identity that can be related to topics in the Math curriculum.

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
The following standard statements can be found in previous sections: *A.CED.1: See page 2* *A.CED.2: See page 3* *A.APR.3: See page 11* *A.APR.4: See page 11* *A.REI.4b:See page 10* *A.SSE.2: See page 10* *A.SSE.3 & 3a: See page 10* *F.IF.4: See page 4* *F.IF.5: See page 5* *F.IF.7: See page 3* *F.IF.7c: See page 11* *F.IF.8a: See page 11* *F.BF.1: See page 6* *N.CN.7: See page 12* 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.2 Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$. F.BF.1b Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by*	**Polynomial Functions**	Analyze the end behavior of polynomial functions. Find the value of the function using direct substitution and synthetic substitution. Add, subtract, and multiply polynomials. Solve polynomial equations by factoring. Find all zeros (real and imaginary) of polynomial functions. *Factor polynomials incorporating Remainder Theorem and Factor Theorem. *Divide polynomials using factoring, long division and synthetic division. *Modeling real world problems using polynomial functions		

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
adding a constant function to a decaying exponential, and relate these functions to the model. N.CN.8 Extend polynomial identities to the complex numbers. *For example, rewrite* $x^2 + 4$ *as* $(x + 2i)(x - 2i)$. N.CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.				
The following standard statements can be found in previous sections: *A.CED.2: See page 3* *A.CED.4: See page 2* *F.IF.5: See page 5* F.BF.1 Write a function that describes a relationship between two quantities. a. 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.*	**Operations and Relations of Functions** *(Semester placement varies)*	Find inverse functions. Determine whether two functions are inverses. Find composite functions		

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
b. Compose functions. *For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time*. 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,* $f(x) = 2x^3$ *or* $f(x) = (x+1)/(x-1)$ *for* $x \neq 1$. b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse. d. Produce an invertible function from a non-invertible function by restricting the domain.				

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. 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. *For example, we define* $5^{1/3}$ *to be the cube root of 5 because we want* $(5^{1/3})^3 = 5^{(1/3)3}$ *to hold, so* $(5^{1/3})^3$ *must equal 5*. N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**Rational Exponents**	Simplify expressions containing rational exponents or radicals. Use properties of exponents. Write and evaluate expressions containing rational exponents and radicals.		
The following standard statements can be found in previous sections: *A.REI.11: See page 8* *F.IF.4: See page 4* *F.IF.5: See page 5* *F.BF.3: See page 7* *N.RN.2: See above* 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. b. Graph square root, cube root, and	**Radical Functions** *(Semester placement varies)*	Solve radical equations. Graph radical functions		

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
piecewise-defined functions, including step functions and absolute value functions.				
The following standard statements can be found in previous sections: *N.Q.1: See page 1* *A.CED.1: See page 2* *A.CED.2: See page 3* *A.CED.4: See page 2* *A.REI.1: See page 1* *A.REI.2: See page 18* *A.REI.11: See page 8* *F.IF.4: See page 4* *F.IF.5: See page 5* *F.BF.3:See page 7* A.APR.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a non-zero rational expression; add, subtract, multiply, and divide rational expressions. F. IF.7d Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	**Rational Functions**	Simplify, multiply and divide rational expressions. Simplify complex fractions. Solve rational equations and check for extraneous solutions. Identify domain restrictions. Model real world problems using inverse variation. *Add and subtract rational expressions. *Graph rational functions. *Identify vertical and horizontal asymptotes and holes.		

Archdiocese of Newark Catholic Schools
Curriculum Map for High School Algebra 2

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
The following standard statements can be found in previous sections: *A.CED.2: See page 3* *A.REI.11: See page 8* *A.SSE.1 & 1b:1See page 1* *A.SSE.3: See page 10* *F.IF.4: See page 4* *F.IF.8: See page 11* *F.BF.3: See page 7* *F.BF.4b: See page 17* F.LE.2: *See page 5* F.LE.5: *See page 7* F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay. F.BF.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	***Exponential and Logarithmic Functions**	*Graph exponential growth and decay functions. *Solve problems using exponential growth and decay. *Simplify and evaluate logarithmic expressions. *Convert exponential form into logarithmic form and vice-versa. *Use the properties of logarithms to simplify logarithmic expressions. *Expand and condense logarithmic expressions. *Solve exponential and logarithmic equations.		

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. F.LE.4 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.				
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.MD.3 Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. *For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five*	***Probability**	*Apply the counting principal. * Use permutations and combinations to compute probabilities of compound events and solve problems. *Use probability.		

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes. S.MD.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). S.MD.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). 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				

Second Semester				
Standards	**Content**	**Skills**	**Assessment**	**Gospel Values**
the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*. 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.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.				

Second Semester

Standards	Content	Skills	Assessment	Gospel Values
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.				