DEPARTMENT <u>Mathematics</u>   COURSE <u>Algebra IB</u>

Curriculum Development Timeline

School: Ocean Township High School

Course: Algebra IB

Department: Mathematics

Board Approval	Supervisor	Notes
July 2016	Amanda Maltese	Born Date
March 2019	Nichole Kerney	Review
August 2022	Gerard Marrone	Alignment to Standards

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Township of Ocean Pacing Guide			
Week	Marking Period 1	**Week**	Marking Period 3
1	Systems of Equations	11	Quadratic Equations and Functions
2	Systems of Equations	12	Quadratic Equations and Functions
3	Systems of Equations	13	Quadratic Equations and Functions
4	Exponents and Exponential Functions	14	Quadratic Equations and Functions
5	Exponents and Exponential Functions	15	Radical Expressions and Equations
Week	Marking Period 2	**Week**	Marking Period 4
6	Exponents and Exponential Functions	16	Radical Expressions and Equations
7	Polynomial Expressions and Factoring	17	Radical Expressions and Equations
8	Polynomial Expressions and Factoring	18	Probability, Data, & Statistics
9	Polynomial Expressions and Factoring	19	Probability, Data, & Statistics
10	Polynomial Expressions and Factoring	20	Rational Expressions

Core Instructional & Supplemental Materials including various levels of Texts
Core Instruction: Big Ideas Algebra 1 Textbook and Ebook (Cengage Learning) Supplemental: iXL Math, Kuta, PARCC Released Questions, 3 Acts Math and Desmos Special Education and ELL Supplemental: Video Tutor - BigIdeasMath.com

Time Frame	3 Weeks (15 blocks)
Topic	

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Systems of Equations
Alignment to Standards
N.Q.2, N.Q.3, A.CED.2, A.CED.3, A.REI.5, A.REI.6, A.REI.10, A.REI.11, F.IF.2, F.IF.9
Learning Objectives and Activities

SWBAT answer the following questions:
- How do you solve a system by graphing?
- How do you solve a system by substitution?
- How do you solve a system by eliminating a variable?
- What kind of application problem can be solved using a system? How do you determine the number of solutions of a system?

SWBAT demonstrate understanding of the following:
- The point of intersection of two linear equations can be determined by several methods (graphing, substitution, elimination).
- Systems of equations can have no solutions, 1 solution or infinite solutions depending on the equations in the system.
- In some cases one method may be difficult and another method may be a better choice.   In some cases the lines may be parallel or the same line.
- Solving a system of equations is a useful way to find solutions to real world problems (ie break even point and other applications)

Learning Activities:
- Video tutor – phschool.com
- TI 83 – tables, graphs p380
- Worksheets
- Partner lab activity – pilot rescue mission
- Modeling real world problems
- Active math – interactive textbook
- Derive computer lab
- Communicators

Assessments

Formative:
- Classwork and Homework
- Class Debate of Approaches/Mathematical Methods
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

Summative:

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- Mid-unit Quizzes
- Topic Tests
- Problem-based Quiz/Test on systems in the real-world

Benchmark:
- Cumulative midterm exam with multiple choice, short answer, and extended constructed response questions.

Alternative:
- Observation Assessment with Problem-solving
- Project - Determine which is the better buy?
- Individual or group productive struggle assessment during introductory lessons
- Derive computer lab on systems

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.1.8.CDM.2: In solving a system of equations students will demonstrate an understanding of the terminology associated with different types of credit (e.g., credit cards, installment loans, mortgages, lines of credit) and compare and calculate the interest rates associated with each.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access the Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.
- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

Students will use internet based game sites such as Quizizz, Kahoot, and Quizlet live to reflect on their learning progress.
- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Supplemental instruction and math games will be presented using IXL Math and Video Tutor bigideasmath.com.
- 9.4.12.TL.1: Assess digital tools based on features such as accessibility

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options, capacities, and utility for accomplishing a specified task
Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Students will use graphing calculators to use math tools strategically and attend to precision and will use Desmos in order to discover new concepts involving graphing and functions.
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping

Career Education

CRP2: Apply appropriate academic and technical skills.
CRP11: Use technology to enhance productivity.

Time Frame	3 Weeks (15 blocks)

Topic

Exponents and Exponential Functions

Alignment to Standards

N.RN.1, A.SSE.3.c, A.SSE.1.b, A.CED.2, A.REI.10, F.IF.2, F.IF.7.e, F.IF.9, F.BF.3, F.LE.1.a, F.LE.1.b, F.LE.1.c, F.LE.2, F.LE.3, F.LE.5

Learning Objectives and Activities

SWBAT answer the following questions:
- How do you use exponent properties involving products and quotients?
- How do you simplify expressions using zero and negative exponents?
- How do you transform into scientific notation?
- How do you simplify exponential expressions with multiple variables?
- How do you simplify a power to a power?
- What does an exponential function look like?
- How do you write and graph an exponential growth/decay function?

SWBAT demonstrate understanding of the following:

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- To simplify algebraic expressions with exponents.
- Recognize and graph exponential functions with a table of values
- Real world situations involving exponential relationships can be solved using multiple representations

Learning Activities:
- Video tutor – bigideasmath.com
- TI 83 – explore exponential graphs
- Experiment – exponential growth or decay model (ie m&m activity)
- Worksheets
- PowerPoint slides on teacher drive – "monomials rules review"
- Jeopardy – computer lab or projector.

Assessments

<u>Formative:</u>
- Classwork and Homework
- Daily Practice Problems
- Teacher Observation
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

<u>Summative:</u>
- Mid-unit Quizzes
- Topic Tests

<u>Alternative:</u>
- Observation Assessment with Problem-solving
- Kahoot/Quizizz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access the Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.

- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

Students will use internet based game sites such as Quizizz, Kahoot, and Quizlet live to reflect on their learning progress.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Supplemental instruction and math games will be presented using IXL Math and Video Tutor bigideasmath.com.

- 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task

Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Students will use Desmos in order to discover new concepts involving graphing and functions.

- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping

Career Education

CRP6: Demonstrate creativity and innovation.
CRP11: Use technology to enhance productivity.

Time Frame	3 Weeks (15 blocks)
Topic	
Polynomial Expressions and Factoring	
Alignment to Standards	

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<u>A.APR.1, A.APR.3, A.APR.4, A.SSE.2, A.SSE.3.a, A.CED.1, A.REI.4.b, F.IF.7.c, F.IF.8.a</u>

Learning Objectives and Activities

SWBAT answer the following questions:
- How do you factor using the greatest common factor?
- How do you add, subtract, and multiply polynomials?
- How do you use special product patterns to multiply binomials?
- How do you factor a difference of squares?
- How do you factor a perfect square trinomial?
- How do you factor a trinomial with a leading coefficient?
- How do you factor completely?

SWBAT demonstrate understanding of the following:
- Understanding the properties of real numbers can be used to multiply a monomial by a polynomial or simplify the product of binomials.
- Factoring is the opposite of the distributive property.
- What does it mean to find a factor of a number?
- Explain why a factored expression is useful-what can we do with it?

Learning Activities:
- Factoring Relay Game
- www.hippocampus.org
- Algebra Tiles Activity
- Using Models to Factor
- Small group practice
- Derive 5
- Communicators

Assessments

<u>Formative:</u>
- Classwork and Homework
- IXL Practice
- Teacher Observation
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

<u>Summative:</u>
- Mid-unit Quizzes
- Topic Tests
- Problem-based Quiz/Test on Maximization

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<u>Alternative:</u>
- Observation Assessment with Problem-solving
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

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- 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task

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- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Students will use graphing calculators to use math tools strategically and attend to precision.
- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement,

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and spatial grouping
Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	4 Weeks (20 blocks)
Topic	
Quadratic Equations and Functions	
Alignment to Standards	
A.APR.3, A.CED.1, A.CED.2, A.CED.3, A.REI.4.a, A.REI.4.b, A.REI.10, A.SSE.3.a, A.SSE.3.b, F.IF.2, F.IF.4, F.IF.5, F.IF.7.a, F.IF.7.c, F.IF.8.a, F.IF.9, F.BF.3	
Learning Objectives and Activities	

SWBAT answer the following questions:
- How do you graph a quadratic function?
- How do you solve a quadratic using factoring?
- How do you solve a quadratic using graphing?
- How do you solve a quadratic using square roots?
- How do you solve a quadratic using the quadratic formula?
- What does the discriminant tell you about the solutions of a quadratic function?

SWBAT demonstrate understanding of the following:
- Students will be able to distinguish second degree equations (quadratic) from first degree (linear). Students will be able to a compare and identify applications of linear, quadratic or exponential functions as models of real world situations.
- The quadratic formula is most appropriately used when factoring a quadratic equation is not possible.

Learning Activities:
- Video tutor – bigideasmath.com
- TI 83 – compare transformations of parent function, compare linear, quadratic, exponential
- Green globs
- Internet project on powerpoint to determine applications of parabolas.
- Excel /TI 83 activity to find linear, quadratic, exponential regression trend line.

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- Worksheets
- Communicators

Assessments

Formative:
- IXL Practice
- Teacher Observation
- Class Debate of Approaches/Mathematical Methods
- Graphic Organizer
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

Summative:
- Mid-unit Quizzes
- Topic Tests

Alternative:
- Observation Assessment with Problem-solving
- Kahoot/Quizizz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Students will access the Big Ideas online ebook to further investigate lesson concepts and demonstrate understanding of standards.
- 9.4.8.TL.3: Select appropriate tools to organize and present information digitally.

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- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

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- 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task

Students will use Google Classroom to collaborate, work towards solving authentic problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Students will use graphing calculators to use math tools strategically and attend to precision and will use Desmos in order to discover new concepts involving graphing and functions.

- 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping

Career Education
CRP6: Demonstrate creativity and innovation. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP11: Use technology to enhance productivity.

Time Frame	3 Weeks (15 blocks)
Topic	
Radical Expressions and Equations	
Alignment to Standards	
A.REI.2, F.IF.7.b	
Learning Objectives and Activities	
SWBAT answer the following questions: • How do you simplify a radical?	

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- How do you estimate a radical?
- How do you simplify radicals involving products and quotients?
- How do you simplify sums and differences?

SWBAT demonstrate understanding of the following:
- Operations can be performed with radical expressions.
- Radical expressions can be simplified by using factoring of the number into primes.
- Square roots are the reverse of perfect squares.
- Why can simplifying a radical first help when combining radical expressions?
- Why would we want to write 5 instead of $\sqrt{25}$?

Learning Activities:
- Create a table of and compare different radicals
- Small group practice
- Jeopardy
- Student presentation
- Communicators

Assessments

<u>Formative:</u>
- Classwork and Homework
- Daily Practice Problems
- IXL Practice
- Teacher Observation

<u>Summative:</u>
- Mid-unit Quizzes
- Topic Tests

<u>Alternative:</u>
- Kahoot
- Quizizz

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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Career Education

CRP6: Demonstrate creativity and innovation.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them

Time Frame	2 Weeks (10 blocks)
Topic	
Probability, Data, and Statistics	
Alignment to Standards	
N.Q.3, A.CED.2, F.IF.4, S.ID.1, S.ID.2, S.ID.3, S.ID.5, S.ID.6.a, S.ID.6.b, S.ID.6.c, S.ID.7, S.ID.8, S.ID.9, S.CP.1, S.CP.2, S.CP.3, S.CP.4, S.CP.5, S.CP.6, S.CP.8(+)	

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Learning Objectives and Activities

SWBAT answer the following questions:
- How do you find the mean, median, mode and range?
- How do you make and analyze data using a scatter plot, and a stem and leaf plot?
- How do find theoretical and experimental probability?
- How do you determine and find the probability of independent and dependent events?
- How you find the line of best fit?
- How do you use the line of best fit to predict an event?

SWBAT demonstrate understanding of the following:
- You can compare and make predictions about data by organizing graphically and analyzing spread and central tendencies.
- Finding the line of best fit using the graphing calculator and by choosing 2 points, connecting them and finding the equation of that line.
- Remember the difference between the independent and dependent variable- the independent comes "first" and dependent comes second, it depends on what happens with the other.

Learning Activities:
- Graphing calculator activity (such as height vs. shoe size)
- Statistics packet
- Graphing calculator overhead
- www.mathtopia.com

Assessments

<u>Formative:</u>
- Classwork and Homework
- Teacher Observation
- Class Debate of Approaches/Mathematical Methods
- Entrance/Exit Cards

<u>Summative:</u>
- Mid-unit Quizzes
- Topic Tests

<u>Alternative:</u>
- Observation Assessment with Problem-solving
- Kahoot/Quizizz

Interdisciplinary Connections

Science: HS-LS3-3: In this statistics unit students will apply concepts of statistics and

Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

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probability to explain the variation and distribution of expressed traits in a population. HS-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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Career Education

CRP2: Apply appropriate academic and technical skills.

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CRP4: Communicate clearly and effectively with reason.

Time Frame	1 Week (5 blocks)
Topic	
Rational Expressions	
Alignment to Standards	
A.APR.7	
Learning Objectives and Activities	

SWBAT answer the following questions:
- How do you simplify rational expressions?
- How do you multiply rational expressions?
- How do you divide rational expressions?
- How do you divide polynomials?
- How do you add and subtract rational expressions with common denominators?
- How do you add and subtract rational expressions with unlike denominators?

SWBAT demonstrate understanding of the following:
- A rational function can be written as the ratio of two polynomials.
- The domain of a rational function is defined as the set of all numbers except those that make the denominator equal to zero.
- Factoring the numerator and denominator and canceling out the common factors is how to simplify.

Learning Activities:
- Bingo
- Scavenger hunt
- Color activity to help simplify

Assessments

<u>Formative:</u>
- IXL Practice
- Teacher Observation
- Math Scavenger Hunt/Trail
- Entrance/Exit Cards

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Summative:
- Mid-unit Quizzes
- Topic Tests

Benchmark:
- Cumulative final exam with multiple choice, short answer, and extended constructed response questions.

Alternative:
- Kahoot/Quizizz
- Individual or group productive struggle assessment during introductory lessons

Interdisciplinary Connections

ELA: W.9-10.1: When students are justifying their reasoning on short answer and extended constructed response questions they write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Career Readiness, Life Literacies, and Key Skills

Technology Integration

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problems, or participate in an online classroom discussion utilizing pre-learned etiquette about blended learning platforms.

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Career Education

CRP6: Demonstrate creativity and innovation.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)

ELL:
- Work toward longer passages as skills in English increase
- Use visuals
- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:
- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:
- Guided notes and/or scaffold outline for written assignments

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- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:
- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:
- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns