Saint Patrick High School

Curriculum Guide

Department:	Mathematics	**Grade and Level:**	Freshman
Class:	Algebra 1 CP	**Term (Semester or Year):**	All Year

Required Text:	
Additional Resources (i.e. texts, materials, apps, etc.):	iPad Apps Showbie GoodReader Other TI-83/84 Graphing Calculator 2-Pocket Folder 1-inch Binder Pencil or pen daily

Course Description

This level of Algebra I is designed for freshmen students who have demonstrated a working knowledge of mathematics. The course covers traditional topics, including properties of real numbers, algebraic expressions, and linear and quadratic equations. Emphasis is given to problem solving and graphing. Some advanced material is also introduced for the purpose of comparison of similar properties. (1 credit / College Prep weight)

Units Cover by Chapters

Unit	Time
1: Equations & Functions	
2: Real Number System	
3: Solving Linear Equations	
4: Graphing and Writing Linear Functions	
5: Inequalities	
6: Systems of Linear Equations	
7: Exponents & Radicals	
8: Polynomials & Factoring	
9: Quadratic Functions & Equations	
10: Data Analysis/Probability	

Unit 1	Equations and Functions	Time	

Essential Questions

- What is the connection between patterns, expressions, equations, and functions?
- What representations do we have to help us make sense of functions and how do they help?

Learning Targets

“Students will be able to...”

- determine if a mathematical statement is numeric, algebraic, an expression, an inequality, or an equation.
- evaluate an algebraic expression using the order of operations.
- apply the order of operations to obtain a simplified expression.
- compose an expression which represents a pattern from either a table, verbal phrase, or pictogram.
- compose an equation which represents a pattern from either a table, verbal phrase, or pictogram.
- recognize a function as a rule which transform elements from the domain to the range.
- graph a function based off of a table of values or verbal description.
- employ function notation to predict and interpret outcomes.
- distinguish which relations are functions and sub categorize discrete and continuous functions.

Common Core Standards

Content	Practice
<table><tr><th>Domains</th><th>Clusters</th><th>Standards</th></tr><tr><td>A</td><td>CED</td><td>1, 2</td></tr><tr><td>A</td><td>SSE</td><td>1a</td></tr><tr><td>N</td><td>RN</td><td>3</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 6 - Attend to precision. MP 7 - Look for and make use of Structure

Common Assessments

Unit 2	Real Number System	Time	

Essential Questions

- How can we represent and categorize real numbers into sets?
- How does the set which a real number applies to affect how it can be simplified?

Learning Targets

“Students will be able to...”

- distinguish between the properties of real numbers (associative, commutative, and identity).
- calculate the sum or difference of two rational numbers.
- calculate the product or quotient of two rational numbers.
- order real numbers on the real line by referencing the notion of absolute value.
- apply the distributive property over a set of parentheses to aide simplification.
- classify the hierarchy of real numbers and distinguish mutually exclusive sub-classes.
- simplify an expression with irrational squareroots.

Common Core Standards

Content	Practice
<table><tr><th>Domains</th><th>Clusters</th><th>Standards</th></tr><tr><td>N</td><td>Q</td><td>1, 2, 3</td></tr><tr><td>A</td><td>CED</td><td>1, 4</td></tr><tr><td>A</td><td>REI</td><td>1, 3</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 5 - Use appropriate tools strategically. MP 7 - Look for and make use of Structure MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments

Unit 3	Solving Linear Equations	Time	

Essential Questions

- What series of inverse operations could we use to solve a given linear equation?
- How do operations with real number and variables compare and contrast?

Learning Targets

“Students will be able to...”

- solve one-step linear equations by using inverse operations and properties of equality.
- solve multi-step linear equations by using inverse operations and properties of equality.
- solve linear equations with variables on both sides of the equal sign using inverse operations and properties of equality.
- isolate variables in literal equations using inverse operations and properties of equality.
- compose ratios and proportions relating two quantities.
- calculate unit rates to model real-world situations and justify conclusions.
- design proportions to help solve for unknown quantities involving percentages.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standard</th></tr><tr><td>A</td><td>APR</td><td>1</td></tr><tr><td>A</td><td>CED</td><td>1</td></tr><tr><td>A</td><td>REI</td><td>1, 3, 11</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 7 - Look for and make use of Structure MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments

Unit 4	Graphing & Writing Linear Equations	Time	

Essential Questions

- What characteristics of a line make it unique?
- How can we create a graph of a linear function?
- What are all of the ways we can represent an equation of a line? Their particular advantages/disadvantages?

Learning Targets

“Students will be able to...”

- illustrate fluency with the Cartesian plane by labeling and matching coordinates, axes, and quadrants.
- sketch a line using the x and y intercepts by understanding how they can be obtained from the equation.
- calculate the rate of change and slope of a linear equation by using a table of values.
- graph a linear equation in slope-intercept form.
- analyze the graph of a linear equation and determine its corresponding equation / function rule.
- convert between various equation forms of a line.
- argue and defend why an equation does or does not represent a linear function.
- express parallel lines in terms of slope.
- create a trend line of best fit given a set of coordinates.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>A</td><td>F.IF</td><td>1, 2, 4</td></tr><tr><td>A</td><td>F.BF</td><td>1</td></tr><tr><td>A</td><td>F.LE</td><td>1</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 3 - Construct viable arguments and critique the reasoning of others. MP 4 - Model with mathematics MP 7 - Look for and make use of structure.

Common Assessments

Unit 5	Inequalities	Time	

Essential Questions

- How does the process for solving inequalities compare and contrast with equations?
- What does the solution to an inequality, or set of inequalities represent?
- In what ways do graphs help us understand inequalities?

Learning Targets

“Students will be able to...”

- create and match an inequality using proper notation with its graphical representation.
- solve one-step and multi-step inequalities using inverse operations and properties of inequalities.
- solve compound inequalities using inverse operations and properties of inequalities.
- graph solutions to compound inequalities taking into account how “and/or” affects the composition.
- extend their understanding of inequalities and utilize it to solve and graph absolute value inequalities.
- extend understanding of graphing inequalities to represent solutions to two variable inequalities on the Cartesian plane.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>8</td><td>EE</td><td>5, 6, 7</td></tr><tr><td>A</td><td>CED</td><td>1</td></tr><tr><td>A</td><td>F.IF</td><td>7a</td></tr><tr><td>A</td><td>F.LE</td><td>2</td></tr></table> Q2	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 3 - Construct viable arguments and critique the reasoning of others. MP 4 - Model with mathematics MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments

Unit 6	Systems of Equations/Inequalities	Time	

Essential Questions

- What is a system of equations/inequalities and what does its solution represent?
- What features of a system determine the best method to solve the system?

Learning Targets

“Students will be able to...”

- Determine whether a point is or is not a solution to a particular system.
- Graph a system of equations to find a solution.
- Apply the substitution method to solve a system.
- Apply the elimination method to solve a system.
- Model and determine the solution to a system in a real world context.
- Extend their knowledge of systems of equations to inequalities.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standard</th></tr><tr><td>8</td><td>EE</td><td>8</td></tr><tr><td>A</td><td>REI</td><td>6, 12</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 7 - Look for and make use of structure. MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments

Unit 7	Exponents & Exponential Functions	Time	

Essential Questions

- How can we create equivalent exponential expressions?
- What are the defining features and implications of exponential functions?
- How can radicals be re-imagined as exponents?

Learning Targets

“Students will be able to...”

- Interpret the definition of an exponent to create equivalent expressions.
- Apply exponent arithmetic to create equivalent expressions.
- Graph an exponential function when provided an equation.
- Describe how the parameters in an equation determine the graphs form.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>8</td><td>EE</td><td>1</td></tr><tr><td>A</td><td>N.RN</td><td>1, 2</td></tr><tr><td></td><td></td><td></td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 3 - Construct viable arguments and critique the reasoning of others. MP 6 - Attend to precision.

Common Assessments

Unit 8	Polynomials & Factoring	Time	

Essential Questions

- How can we tell when a polynomial expression is most simplified?
- How are operations with polynomials similar to operations with whole numbers?
- Describe the geometric and algebraic advantages of factoring polynomials?

Learning Targets

“Students will be able to...”

- Classify polynomial expressions by their characteristics.
- Add/Subtract polynomial expressions.
- Multiply/Divide polynomial expressions.
- Factor out a monomial from a polynomial expression.
- Factor a polynomial expression into binomials (by grouping, by trinomial algorithm).
- Factor and critique “difference of squares” and “perfect square trinomials”

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>A</td><td>APR</td><td>1, 2, 3</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 3 - Construct viable arguments and critique the reasoning of others. MP 4 - Model with mathematics MP 5 - Use appropriate tools strategically. MP 6 - Attend to precision. MP 7 - Look for and make use of structure. MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments

Unit 9	Quadratic Equations	Time	

Essential Questions

- What are the defining characteristics of a quadratic equation?
- How do the equation and graph of a quadratic determine each other?
- How do the characteristics of a quadratic equation help us solve?

Learning Targets

“Students will be able to...”

- Graph a parabola given an equation in standard form.
- Locate the vertex, axis of symmetry, zeros, and direction of a parabola given either an equation or graph.
- Solve a quadratic equation by using simple inverse operations.
- Solve a quadratic equation by factoring.
- Solve a quadratic equation by using the quadratic formula.
- Articulate how the pieces of the quadratic formula tell us about features of its graph.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>A</td><td>F.IF</td><td>7</td></tr><tr><td>A</td><td>REI</td><td>4</td></tr><tr><td>a</td><td>SSE</td><td>3</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 4 - Model with mathematics MP 7 - Look for and make use of structure.

Common Assessments

Unit 10	Data Analysis / Probability	Time	

Essential Questions

- What can we say about data given a particular set?
- How can we use mathematical models to represent and calculate probabilities?
- What important distinctions should we make at the beginning of analyzing data?

Learning Targets

“Students will be able to...”

- Determine the mean, median, mode, and range of a given data set.
- Identify whether a situation represents a theoretical or experimental probability.
- Calculate the probability of independent and dependent eventsa
- Apply the concept of intersections and unions to solve for given probabilities.

Common Core Standards

Content	Practice
<table><tr><th>Domain</th><th>Cluster</th><th>Standards</th></tr><tr><td>A</td><td>S.ID</td><td>2</td></tr><tr><td>A</td><td>S.CP</td><td>1, 2, 5, 6, 7</td></tr></table>	MP 1 - Make sense of problems and persevere in solving them. MP 2 - Reason abstractly and quantitatively. MP 3 - Construct viable arguments and critique the reasoning of others. MP 4 - Model with mathematics MP 5 - Use appropriate tools strategically. MP 6 - Attend to precision. MP 7 - Look for and make use of structure. MP 8 - Look for and express regularity in repeated reasoning.

Common Assessments