Algebra I Blueprint

Algebra I is an introduction to algebraic methods and the application of these methods for problem solving. The course contains a study of number theory, patterns and probability. Students learn how to solve, interpret and graph one or two variable linear equations/inequalities and exponential equations. The students are introduced to functional notation and quadratic equations. Throughout the year, students will explore real-life uses of mathematics.

School-Wide Expectations

Students will demonstrate:
- Problem-solving and critical thinking skills
- Quantitative reasoning and mathematical skills
- Effective use of information and technology skills

Learning Goals

Students will:

- Understand and describe patterns and functional relationships (9-12cor:2.2a*; NM-NUM.9-12.1**).
- Represent quantities in various formats and identify properties of equalities and operations (9-12cor:2.2a*; NM-NUM.9-12.1**).
- Simplify and evaluate expressions, equations and inequalities using appropriate properties (9-12cor:1.3a; NM-ALG.9-12.2).
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities (9-12ext:1.2a and 9-12cor:3.2a; NM-ALG.9-12.3).
- Use rates, ratios, percents and variation models to relate quantities (9-12cor:2.2b; NM-ALG.9-12.4).
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane (9-12:4.1a; NM-DATA.9-12.1). Assessment # 2
- Apply basic concepts of probability (9-12 cor:4.3; NM-DATA. 9-12.4)
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis (9-12cor:1.3a; NM-ALG.9-12.2). Assessment #1
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models (9-12cor:1.2a; NM-NUM.9-12.1). Assessment #1, 2
  - Identify and utilize characteristics of linear functions including slope and intercepts (9-12cor:1.2a; NM-NUM.9-12.1).
  - Apply the quadratic formula, take square roots, factor, find the vertex, use the discriminant, and complete the square given a quadratic function or equation (9-12cor:1.3a; NM-NUM.9-12.1). Assessment #3
  - Observe growth (or decay) and asymptotic behavior of exponential functions, as well as apply the compound interest formula (9-12ext:1.2a; NM-NUM.9-12.1).
  - Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients (9-12cor:1.2a; NM-NUM.9-12.1).
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course (9-12cor:1.3a; NM-ALG.9-12.3). Assessment #1, 3
**Course Content**

List topics:
- Patterns
- Solving Linear Equations
- Graphing Linear Equations
- Solving/Graphing Linear Inequalities
- Solving Systems of Linear Equations
- Powers and Exponents
- Polynomials and Factoring
- Quadratic Equations/Inequalities
- Pythagorean Theorem/Distance Formula
- Function Notation
- Radicals and Radical Equations
- Proportions and Rational Equations

List textbooks and other resources:
- Heath Algebra 1: An Integrated Approach by Larson, Kanold & Stiff
- Calculators
- AverKey Display (when available)
- Various handouts, displays and visuals

**Instructional Strategies**

- Guided Discovery
  - Using existing knowledge, students are led to ascertain more advanced concepts on their own.
- Guided Practice
  - Students are given various problems related to new material in class.
  - Teacher assesses student performance and provides individual instruction when needed.
- Cooperative Learning
  - Group projects and assignments are given to apply skills to real-life situations and to foster a cooperative learning environment.
  - Students work in pairs to assess their answers and help each other when needed.
  - Class discussions are often held in conjunction with guided discovery lessons.
- Direct Instruction
  - Students learn new material in a more traditional teacher-driven format.
  - After new material is introduced, one or more of the above strategies are usually used for assessment and/or reinforcement.
  - An emphasis is placed on note-taking skills.
  - Because this is a college preparation course, students are taught how to be academically successful when taught in a more traditional manner.

School-Wide Rubrics (see attached)
- Mathematical Thinking
- Problem-Solving and Critical Thinking Skills
- Technology
Teacher Generated Assessments
   - Unit Tests
   - Quizzes
   - Common Assessments
CAPT Released Items
Group Evaluations

**Check all that apply and describe briefly below:**

✓ Authentic Assessment
   Practice CAPT Problems
   Various Projects
   Word Problems

✓ Technology
   Scientific Calculators/Graphing Calculators
   TI-83 Overhead display (when available)
   AverKey (when available)
   Computer Labs
Sequence and Pacing Guide  
Algebra 1 College Prep  
1st Semester

I. **Patterns (Introduction to Sequences and Series) (2 weeks)**

**Learning Goals**
- Understand and describe patterns and functional relationships
- Represent quantities in various formats and identify properties of equalities and operations
- Simplify and evaluate expressions, equations and inequalities using appropriate properties
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course

**Objectives**
*Students will:*
  a. Find and express a pattern for a number set or a real-world scenario.
  b. Write recursive rules for arithmetic (linear) and geometric (exponential) sequences.
  c. Find and test explicit rules for arithmetic and geometric sequences.
  d. Make and justify predictions based on patterns.
  e. Use models to make, test and describe conjectures involving properties of two- and three-dimensional figures.
  f. Use home screen, \( y = \), and table of the graphing calculator to explore explicit rules for patterns.

**Common Activity**
“The Great Aunt Problem”

II. **Solving Linear Equations (3.5 weeks)**

**Learning Goals**
- Solve for unknown variable(s) using properties of equalities.
- Represent quantities in various formats and identify properties of equalities and operations.
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Use rates, ratios, percents and variation models to relate quantities.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives

Students will:

a. Identify and define the properties of equality.
b. Use the distributive property and combining like terms to simplify expressions.
c. Translate word phrases or sentences into algebraic expressions, equations and inequalities.
d. Solve two-step equations and check the solution by substitution.
e. Solve multi-step equations including equations with the distributive property combining like terms and variables on both sides and check the solution by substitution.
f. Solve proportions that result in multi-step linear equations.
g. Use proportions to calculate percents and solve real world problems.
h. Solve real world problems using linear equations.
i. Evaluate and transform literal equations.
j. Informally justify the steps in an algebraic proof using appropriate properties, axioms and definitions.

Instructional Strategies

Graphic Organizer: Five-Steps for Problem Solving

Common Assessment: Solving Linear Equations- “How Many Pies?”
Includes topics: solving multi-step equation, real world application

III. Solving Inequalities (2 weeks)

Learning Goals

- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives

Students will:

a. Graph inequalities on a number line.
b. Translate a number line graph into an algebraic inequality.
c. Identify and define the properties of inequality.
d. Solve multi-step inequalities and check the solution.
e. Solve compound inequalities and graph their solution sets.
f. Solve real world problems using inequalities.

**Instructional Strategies**
Graphic Organizer: Five-Steps for Problem Solving

**IV. Graphing Linear Functions and Relations (5 weeks)**

**Learning Goals**
- Use rates, ratios, percents and variation models to relate quantities
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Identify and utilize characteristics of linear functions including slope and intercepts.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this.

**Objectives**
*Students will:*

a. Graph ordered pairs and data using appropriate coordinate axes and labels.

b. Identify ordered pairs and their location by quadrant or axis.

c. Identify when a relation (given in various forms) is a function.

d. **Evaluate a function** \(f(x)\) **for a given value.**

e. Identify the domain and range.

f. Graph a linear equation using a table of values.

g. **Be able to change symbolic to tabular and graphical representations of a linear function.**

h. Determine and use the \(x\) and \(y\) intercepts to graph a linear function.

i. Develop the concept of slope as rate of change and determine slopes from graphs, tables, algebraic representations, and real world situations.

j. Investigate, describe, and predict the effects of changes in \(m\) and \(b\) on the graph of \(y = mx + b\).

k. Transform linear equations into slope-intercept form.

l. Graph a linear function using the slope and \(y\) intercept.

m. Relate direct variation to linear functions and solve problems involving proportional change.

n. Model a real world situation with a constant rate of change using the graph of a linear function to **interpolate and extrapolate.**

o. Graph linear inequalities in a coordinate plane.

p. Analyze a linear function on a graphing calculator using \(y =\), table setup, table, or trace.

q. Set up a suitable window on the graphing calculator that reflects an understanding of the domain and range of the real world situation or equation.
under study using \( y = \), window, graph, zoom standard, zoom decimal, or zoom integer.

**Instructional Strategies**
Graphic Organizer: Frayer Model - Function

**Common Activities**
“Walk the Plank” Part 1
“Graph Matching”
“Bicycle Paths”

V. **Writing Equations of Lines (3.5 weeks)**

**Learning Goals**
- Represent quantities in various formats and identify properties of equalities and operations
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models
  - Identify and utilize characteristics of linear functions including slope and intercepts
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course

**Objectives**
*Students will:*
  a. Write equations of lines in slope-intercept form and point-slope form given characteristics such as two points, a point and a slope, or a slope and y-intercept.
  b. Write equations of parallel and perpendicular lines.
  c. Model and analyze real world situations with linear functions.
  d. Be able to change between the tabular, graphical, and symbolic representations of a linear function.
  e. Enter ordered pairs in the default list of a graphing calculator and create an appropriate window for the scatter plot in order to test solutions to a linear model.

**Instructional Strategies**
Concept Map – Methods of Graphing
Determining Important Concepts/Terms

**Common Activities**
“Walk the Plank” Part 2
“Equations of Attack” or “Battleship”

**Common Assessment: Linear Functions- “Phone Plans”**
Involves topics: slope as rate of change, slope-intercept form, graphing
VI. **Line of Best Fit (3 weeks)**

**Learning Goals**
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Identify and utilize characteristics of linear functions including slope and intercepts.

**Objectives**
*Students will:*
- a. Draw a scatter plot given a set of data.
- b. Interpret scatter plots recognizing positive, negative or no correlation for data approximating linear situations and model.
- c. Determine the equation of the line of best fit given a scatter plot and use the equation to interpret and make predictions about the data.
- d. Determine the equation of the regression line given a set of real world data using a graphing calculator. (vars, regression equation, catalog, diagnostic on)

**Common Activities**
- “Sea Level Rise”
- “Cricket Thermometers”

VII. **Probability (1.5 weeks)**

**Learning Goals**
- Apply basic concepts of probability in a variety of situations.

**Objectives**
*Students will:*
- a. Differentiate between theoretical and experimental probability.
- b. Determine probability and the odds of a single event.
- c. Compute the probability of a compound event.
- d. Use the Counting Principle to count possible outcomes.
VIII. **Solving Systems of Linear Equations and Inequalities (in two variables) (4 weeks)**

**Learning Goals**
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models
  - Identify and utilize characteristics of linear functions including slope and intercepts.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**
*Students will:*
  a. Solve a system of two equations by graphing.
  b. Determine whether a system of equations contains intersecting, parallel or collinear lines and determine the number of solutions for the system.
  c. Solve a system of two equations by substitution.
  d. Solve a system of two equations by linear combinations (i.e., elimination or addition).
  e. Solve a system involving one equation and one inequality.
  f. Write and solve a system of equations to represent a real world situation.
  g. Solve systems of inequalities by graphing.

IX. **Rules of Exponents and Powers (4 weeks)**

**Learning Goals**
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Use rates, ratios, percents and variation models to relate quantities.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Observe growth (or decay) and asymptotic behavior of exponential functions, as well as to apply the compound interest formula.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**
*Students will:*
  a. Apply properties of exponents to simplify exponential expressions including positive, negative and zero exponents. *(Omit Power to a Power)*
  b. Evaluate exponential expressions and functions.
c. Write numbers in scientific notation.
d. Convert scientific notation to decimal form.
e. Multiply and divide numbers written in scientific notation.
f. Solve real world problems using scientific notations.
g. Graph an exponential function.
h. Investigate $a$ and $b$ in $y = ab^x$ with a graphing calculator.
i. Write and use models for exponential growth and decay for real world problems.

**Common Assessment: Scientific Notation- “Earth to Alpha Centauri”**
Involves topics: writing numbers in scientific notation, converting scientific notation to decimal notation, multiplying or dividing numbers written in scientific notation

**X. Polynomials (2.5 weeks)**

**Learning Goals**
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models
  - Apply the quadratic formula, take square roots, factor, find the vertex, use the discriminant, and complete the square given a quadratic function or equation.
  - Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**
*Students will:*
- Write a polynomial in standard form and identify the leading coefficient.
- Identify polynomials by degree and number of terms.
- Add, subtract, and multiply polynomial expressions.
- Factor polynomials by finding the greatest common factor.
- Factor a trinomial with a leading coefficient of 1 (or identify as prime).
- Factor a binomial that is the difference of two squares.
- Simplify rational expressions. *(if time allows)*
- Solve quadratic equations using factoring and the zero-product property.
- Solve real world area problems using quadratic equations.

**XI. Quadratic Equations and Functions. (2 weeks)**

**Learning Goals**
- Represent quantities in various formats and identify properties of equalities and operations.
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Use rates, ratios, percents and variation models to relate quantities.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Apply the quadratic formula, take square roots, factor, find the vertex, use the discriminant, and complete the square given a quadratic function or equation.
  - Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**

*Students will:*

a. Find approximate or exact values of square roots.
b. Rewrite radicals in simplified form.
c. Add and subtract radical expressions.
d. Solve quadratic equations by the square root method.
e. Use the Pythagorean Theorem to find a missing side of a right triangle.
f. Solve real world problems involving right triangles.
g. Model and solve a real world problem with a quadratic function.

**Instructional Strategies**

Five Steps for Problem Solving

**Common Assessment: Quadratic Equations- “Rectangular Field”**

Involves topics: writing and solving quadratic equations

**Assessment: COMMON FINAL EXAM**
I. Patterns (Introduction to Sequences and Series) (2 weeks)

Learning Goals
- Understand and describe patterns and functional relationships
- Represent quantities in various formats and identify properties of equalities and operations
- Simplify and evaluate expressions, equations, and inequalities using appropriate properties
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course

Objectives
Students will:
- Find and express a pattern for a number set or a real-world scenario.
- Write recursive rules for arithmetic (linear) and geometric (exponential) sequences.
- Find and test explicit rules for arithmetic and geometric sequences.
- Make and justify predictions based on patterns.
- Use models to make, test, and describe conjectures involving properties of two- and three-dimensional figures.
- Use home screen, \( y = \), and table of the graphing calculator to explore explicit rules for patterns.

Common Activity
“The Great Aunt Problem”

II. Solving Linear Equations (3 Weeks)

Learning Goals
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- Represent quantities in various formats and identify properties of equalities and operations.
- Simplify and evaluate expressions, equations, and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Use rates, ratios, percents, and variation models to relate quantities.
Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives
Students will:

a. Identify and define the properties of equality.
b. Solve two-step equations and check the solution by substitution.
c. Solve multi-step equations including equations with the distributive property combining like terms and variables on both sides and check the solution by substitution.
d. Solve proportions that result in multi-step linear equations.
e. Use proportions to calculate percents and solve real world problems.
f. Solve real world problems using linear equations.
g. Evaluate and transform literal equations.
h. Justify the steps in an algebraic proof using appropriate properties, axioms and definitions.

Instructional Strategies
Graphic Organizer: Five-Steps for Problem Solving

Common Assessment: Solving Linear Equations- “How Many Pies?”
Involves topics: solving multi-step equation, real world application

III. Solving Inequalities and Absolute Value Inequalities (2.5 weeks)

Learning Goals
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives
Students will:

a. Graph inequalities on a number line.
b. Translate a number line graph into an algebraic inequality.
c. Identify and define the properties of inequality.
d. Solve multi-step inequalities and check the solution.
e. Solve compound inequalities and graph their solution sets.
f. Solve real world problems using inequalities.
g. Solve absolute value equations.
h. Solve an absolute value inequality and graph the solution set on a number line.
Instructional Strategies
Graphic Organizer: Five-Steps for Problem Solving

IV. Graphing Functions and Relations (4 weeks)

Learning Goals
- Use rates, ratios, percents and variation models to relate quantities
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Identify and utilize characteristics of linear functions including slope and intercepts.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this.

Objectives
Students will:

a. Graph ordered pairs and data using appropriate coordinate axes and labels.
b. Identify ordered pairs and their location by quadrant or axis.
c. Identify when a relation (given in various forms) is a function.
d. Evaluate a function \([f(x)]\) for a given value.
e. Identify the domain and range.
f. Graph a linear equation using a table of values.
g. Be able to change symbolic to tabular and graphical representations of a linear function.
h. Determine and use the \(x\) and \(y\) intercepts to graph a linear function.
i. Develop the concept of slope as rate of change and determine slopes from graphs, tables, algebraic representations, and real world situations.
j. Investigate, describe, and predict the effects of changes in \(m\) and \(b\) on the graph of \(y = mx + b\).
k. Transform linear equations into slope-intercept form.
l. Graph a linear function using the slope and \(y\) intercept.
m. Relate direct variation to linear functions and solve problems involving proportional change.
n. Model a real world situation with a constant rate of change using the graph of a linear function to interpolate and extrapolate.
o. Determine if a function is a direct variation or an inverse variation.
p. Solve inverse variation problems.
q. Graph linear inequalities in a coordinate plane.
r. Analyze a linear function on a graphing calculator using \(y =\), table setup, table, or trace.
s. Set up a suitable window on the graphing calculator that reflects an understanding of the domain and range of the real world situation or equation under study using $y =$, window, graph, zoom standard, zoom decimal, or zoom integer.

Instructional Strategies
Graphic Organizer: Frayer Model - Function

Common Activities
“Walk the Plank” Part 1
“Graph Matching”
“Bicycle Paths

V. Writing Equations of Lines (3 weeks)

Learning Goals
- Represent quantities in various formats and identify properties of equalities and operations
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models
  - Identify and utilize characteristics of linear functions including slope and intercepts
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course

Objectives
Students will:

a. Write equations of lines in slope-intercept form and point-slope form given characteristics such as two points, a point and a slope, or a slope and y-intercept.
b. Write equations of parallel and perpendicular lines.
c. Model and analyze real world situations with linear functions.
d. Be able to change between the tabular, graphical, and symbolic representations of a linear function.
e. Enter ordered pairs in the default list of a graphing calculator and create an appropriate window for the scatter plot in order to test solutions to a linear model.

Instructional Strategies
Concept Map – Methods of Graphing
Determining Important Concepts/Terms

Common Activities
“Walk the Plank” Part 2
“Equations of Attack” or “Battleship”

Common Assessment: Linear Functions- “Phone Plans”
Involves topics: slope as rate of change, slope-intercept form, graphing

VI. Solving Systems of Linear Equations and Inequalities (in two variables)
(2 weeks)

Learning Goals
- Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models
  - Identify and utilize characteristics of linear functions including slope and intercepts.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives
Students will:
  a. Solve a system of two equations by graphing.
  b. Determine whether a system of equations contains intersecting, parallel or collinear lines and determine the number of solutions for the system.
  c. Solve a system of two equations by substitution.
  d. Solve a system of two equations by linear combinations (i.e., elimination or addition).
  e. Solve a system containing one equation and one inequality.
  f. Write and solve a system of equations to represent a real world situation.
  g. Solve systems of inequalities by graphing.

16.5 weeks

Assessment: COMMON MIDTERM EXAM HONORS
2nd Semester             HONORS

VII.                     Line of Best Fit (3 weeks)

Learning Goals
  ● Organize and interpret data sets using various statistical graphs including plots on the coordinate plane.
  ● View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
    ○ Identify and utilize characteristics of linear functions including slope and intercepts.

Objectives
Students will:
  a. Draw a scatter plot given a set of data.
  b. Interpret scatter plots recognizing positive, negative or no correlation for data approximating linear situations and model.
  c. Determine the equation of the line of best fit given a scatter plot and use the equation to interpret and make predictions about the data.
  d. Determine the equation of the regression line given a set of real world data using a graphing calculator. (vars, regression equation, catalog, diagnostic on)

Common Activities
  “Sea Level Rise”
  “Cricket Thermometers”

VIII.                    Probability (1.5 weeks)

Learning Goals
  ● Apply basic concepts of probability in a variety of situations.

Objectives
Students will:
  a. Differentiate between theoretical and experimental probability.
  b. Determine probability and the odds of a single event.
  c. Compute the probability of a compound event.
  d. Use the Counting principle to count possible outcomes.
IX. **Rules of Exponents and Powers (3.5 weeks)**

**Learning Goals**
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Use rates, ratios, percents and variation models to relate quantities.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Observe growth (or decay) and asymptotic behavior of exponential functions, as well as apply the compound interest formula.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**
*Students will:*
  a. Apply properties of exponents to simplify exponential expressions including positive, negative and zero exponents.
  b. Evaluate exponential expressions and functions.
  c. Write numbers in scientific notation.
  d. Convert scientific notation to decimal form.
  e. Multiply and divide numbers written in scientific notation answering with the appropriate number of significant digits.
  f. Solve real world problems using scientific notations.
  g. Graph an exponential function.
  h. Investigate $a$ and $b$ in $y=ab^x$ with a graphing calculator.
  i. Write and use models for exponential growth and decay for real world problems.

**Common Assessment: Scientific Notation- “Earth to Alpha Centauri”**
Involves topics: writing numbers in scientific notation, converting scientific notation to decimal notation, multiplying or dividing numbers written in scientific notation

X. **Polynomials (3.5 weeks)**

**Learning Goals**
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Apply the quadratic formula, take square roots, factor, find the vertex, use the discriminant, and complete the square given a quadratic function or equation.
  - Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients.
- Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

**Objectives**

*Students will:*

  a. Write a polynomial in standard form and identify the leading coefficient.
  b. Identify polynomials by degree and number of terms.
  c. Add, subtract, and multiply polynomial expressions.
  d. Factor polynomials by finding the greatest common factor.
  e. Factor a trinomial with a leading coefficient of 1 (or identify as prime).
  f. Factor a binomial that is the difference of two squares.
  g. Factor a trinomial with leading coefficient not equal to 1.
  h. Factor a polynomial containing a common polynomial factor.
  i. Factor polynomial by grouping.
  j. Simplify rational expressions.
  k. Solve quadratic equations using factoring and the zero-product property.
  l. Solve real world area problems and consecutive integer problems using quadratic equations.

**XI. Quadratic Equations and Functions (4 weeks)**

**Learning Goals**

- Represent quantities in various formats and identify properties of equalities and operations.
- Simplify and evaluate expressions, equations and inequalities using appropriate properties.
- Translate verbal phrases and geometric models into algebraic expressions, equations, and inequalities.
- Use rates, ratios, percents and variation models to relate quantities.
- Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
- View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  - Apply the quadratic formula, take square roots, factor, find the vertex, use the discriminant, and complete the square given a quadratic function or equation.
  - Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients.
• Construct a plan for solving a practical problem using a specific skill or a synthesis of various skills learned in this course.

Objectives

Students will:

a. Find approximate or exact values of square roots.
b. Rewrite radicals in simplified form.
c. Solve quadratic equations by the square root method.
d. Use the Pythagorean Theorem to find a missing side of a right triangle.
e. Solve real world problems involving right triangles.
f. Solve a quadratic equation by completing the square.
g. Use the quadratic formula to find the solutions to quadratic equations.
h. Solve proportions that result in quadratic equations.
i. Use the discriminant to determine the number of solutions for a quadratic equation and describe the nature of the solution(s).
j. Evaluate quadratic functions given a value.
k. Model and solve a real world problem with a quadratic function.
l. Using the graphing calculator approximate the equation of the axis of symmetry, the vertex, the roots, and the y-intercept.
m. Graph a quadratic function by determining the axis of symmetry, the vertex, the y-intercept, and if applicable the roots.

Instructional Strategies

Five Steps for Problem Solving

Common Assessment: Quadratic Equations- “Rectangular Field”

Involves topics: writing and solving quadratic equations

XII. Radicals (1.5 weeks)

Learning Goals

• Simplify and evaluate expressions, equations and inequalities using appropriate properties.
• Solve for unknown variable(s) using properties of equalities (or inequalities) and graphical analysis.
• View and interpret various functions and relations (e.g. linear, quadratic, exponential and absolute value) through table data, graphical interpretations, transformations, algebraic forms and real-life models.
  o Perform operations involving rational, radical, and polynomial expressions and survey polynomials in terms of degree and leading coefficients.

Objectives

Students will:

a. Add, subtract, multiply, and divide radical expressions.
b. Solve radical equations, discarding any extraneous solutions.
Assessment: COMMON FINAL EXAM

HONORS