Unit #5: Systems of Equations

Content Area: **Math**
Course(s):
Time Period: **April**
Length: **6 weeks**
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	

System of Equations

Learning Objectives

- Objective 1 - Apply scales to graphs, origin of graph and data displays.
- Objective 10 - Interpret solutions as viable based on the constants of the application.
- Objective 11 - Rearrange formulas to highlight a quantity of interest.
- Objective 12 - Solve quadratic equations in one variable, including completing the square and quadratic formula.
- Objective 13 - Derive the quadratic formula by completing the square.
- Objective 14 - Use completing the square to transform quadratic equations into the form (x-p)^2=q.
- Objective 15 - Solve system of linear equations with two variables.
- Objective 16 - Understand that the graph of an equation in two variables is the set of all of its solutions plotted in the coordinate plane.
- Objective 17 - Understand that the solution set to an equation in two variables often forms a curve (which could be a line)
- Objective 18 - Explain why the solution of f(x)=g(x) is the x coordinate of their intersection.
- Objective 19 - Find the solutions approximately using technology to graph the function or create a table of values.
- Objective 2 - Use units to make sense of solutions.
- Objective 20 - *Include f(x) & g(x) that are linear, polynomial, rational, absolute value, exponential, and logarithmic*
- Objective 21 - Solve a system of inequalities in two variables by graphing.
- Objective 3 - Apply scales to multi-step problems and formulas.
- Objective 4 - Interpret units in formulas.
- Objective 5 - Choose units in formulas.
- Objective 6 - Define quantities for descriptive modeling problems. (Incorporate appropriate units).

- Objective 7 - Create equation that represents relationships between quantities.
- Objective 8 - Graph equations on axes with labels and scales.
- Objective 9 - Represent solutions of equations, inequalities, and systems to real-world applications.

Essential Skills

- Essential Skill 1 - Artists will be able to apply scales to graphs, origin of graph and data displays.
- Essential Skill 2 - Artists will be able to use units to make sense of solutions.
- Essential Skill 3 - Artists will be able to apply scales to multi-step problems and formulas.
- Essential Skill 4 - Artists will be able to interpret units in formulas.
- Essential Skill 5 - Artists will be able to choose units in formulas.
- Essential Skill 6 - Artists will be able to define quantities for descriptive modeling problems. (Incorporate appropriate units)
- Essential Skill 7 - Artists will be able to create equation that represents relationships between quantities.
- Essential Skill 8 - Artists will be able to derive the quadratic formula by completing the square.
- Essential Skill 8 - Artists will be able to explain why the solution of f(x)=g(x) is the x coordinate of their intersection.
- Essential Skill 8 - Artists will be able to find the solutions approximately using technology to graph the function or create a table of values. Include f(x) & g(x) that are linear, polynomial, rational, absolute value, exponential, and logarithmic
- Essential Skill 8 - Artists will be able to graph equations on axes with labels and scales.
- Essential Skill 8 - Artists will be able to interpret key features from a graph or a table of values. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Essential Skill 8 - Artists will be able to interpret solutions as viable based on the constraints of the application. Example: cannot have negative time
- Essential Skill 8 - Artists will be able to rearrange formulas to highlight a quantity of interest.
- Essential Skill 8 - Artists will be able to represent solutions of equations, inequalities, and systems to real-world applications.
- Essential Skill 8 - Artists will be able to sketch a graph using the key features of a function.
- Essential Skill 8 - Artists will be able to solve a system of inequalities in two variables by graphing.
- Essential Skill 8 - Artists will be able to solve quadratic equations in one variable, including completing the square and quadratic formula.
- Essential Skill 8 - Artists will be able to solve system of linear equations with two variables.
- Essential Skill 8 - Artists will be able to use completing the square to transform quadratic equations into the form (x-p)^2=q.

Standards

MATH.9-12.A.APR.A.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.

MATH.9-12.A.APR.B.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.
MATH.9-12.N.Q.A.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.
MATH.9-12.N.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MATH.9-12.A.CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MATH.9-12.A.CED.A.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.
MATH.9-12.A.CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MATH.9-12.F.IF.B.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.
MATH.9-12.A.REI.B.4	Solve quadratic equations in one variable.
MATH.9-12.A.REI.C.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.
MATH.9-12.A.REI.C.6	Solve systems of linear equations algebraically (include using the elimination method) and graphically, focusing on pairs of linear equations in two variables.
MATH.9-12.A.REI.D.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).
MATH.9-12.A.REI.D.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.
MATH.9-12.A.REI.D.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.
MATH.9-12.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MATH.9-12.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.
MATH.9-12.A.SSE.A.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
MATH.9-12.A.SSE.A.2	Use the structure of an expression to identify ways to rewrite it.
MATH.9-12.A.SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
MATH.9-12.A.SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.
MATH.9-12.A.SSE.B.3.b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
MATH.9-12.A.SSE.B.3.c	Use the properties of exponents to transform expressions for exponential functions.

Instructional Tasks/Activities

- Academic games & Competitions
- Arts inspired projects

- Formative Assessments
- Ladder Activity
- Notes
- Worksheets

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Power Point

- Quizizz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally

- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

Resources

- Resource 1 - www.KhanAcademy.com