GUITAR BUILDING 2023

Day 1: 07.05.23 PRE-TEST ASSESSMENT

DAY 2: 07.06.23 EVALUATING ALGEBRAIC EXPRESSIONS

Objectives

Students will be able to

- find the numerical value of an algebraic expression
    - by substituting the individual variables for numerical values,
    - by substituting multiple variables given as a simple expression, such as $x+y=5$,
- use the numerical value of an algebraic expression to draw conclusions about real-world systems.

Prerequisites

Students should already be familiar with

- writing algebraic expressions,
- relating algebraic expressions to real-world systems,
- order of operations.

Key Vocabulary

- Algebraic expression
- Substitution
- PEMDAS
- Variable
- Coefficient
- Constant
- Order of operations

GUITAR BUILDING 2023

Day 1: PRE-TEST ASSESSMENT

DAY 2: EVALUATING ALGEBRAIC EXPRESSIONS

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Key Vocabulary

- Algebraic expression
- Substitution
- PEMDAS
- Variable
- Coefficient
- Constant
- Order of operations

Exclusions

Students will not cover

- substitutions that require algebraic manipulation,
- substations that require a variable to be expressed in terms of another variable,
- algebraic expressions with more than 3 variables,
- simplifying algebraic expressions,
- rearranging algebraic equations to find the value of a variable.

GUITAR BUILDING 2023

DAY 3: 07.10.23 FACTORING ALGEBRAIC EXPRESSIONS

Objectives

Students will be able to

- find the greatest common factor of an expression and factor it outside the parentheses,
- factor quadratic expressions,
- factor the difference of two squares,
- factor cubic expressions with a common factor x,
- factor polynomial expressions that can be converted into quadratic expressions using a substitution of the form $y=x$.

Prerequisites

Students should already be familiar with

- algebraic expressions,
- polynomials and monomials,
- rules of exponents,
- multiplying polynomials by expanding the parentheses.

Exclusions

Students will not cover

- factoring polynomial expressions that cannot be reduced to quadratics,
- factoring by grouping,
- completing the square.

DAY 4: 07.12.23 Features of Quadratic Functions

Objectives

GUITAR BUILDING 2023

DAY 3:   **FACTORING ALGEBRAIC EXPRESSIONS**

Objectives

Students will be able to

- find the greatest common factor of an expression and factor it outside the parentheses,

- factor quadratic expressions,

- factor the difference of two squares,

- factor cubic expressions with a common factor x,

- factor polynomial expressions that can be converted into quadratic expressions using a substitution of the form $y=x$.

Prerequisites

Students should already be familiar with

- algebraic expressions,

- polynomials and monomials,

- rules of exponents,

- multiplying polynomials by expanding the parentheses.

Exclusions

Students will not cover

- factoring polynomial expressions that cannot be reduced to quadratics,

- factoring by grouping,

- completing the square.

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DAY 4:   **Features of Quadratic Functions**

Objectives

Students will be able to

- find the key features of a quadratic equation from its equation or graph, including its intercepts, vertex, axis of symmetry, domain, and range,

- understand that quadratics are symmetric in the vertical line through their vertex,

- understand that the sign of the leading coefficient tells us the type of extrema that the quadratic function will have,

- recall and apply the formula for the axis of symmetry using the coefficients of the quadratic.

Prerequisites

Students should already be familiar with

- graphing quadratic functions,

- sets,

- the domain and range.

Exclusions

Students will not cover

- solving quadratic equations graphically,

- factoring,

- the vertex form of a quadratic and completing the square.

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DAY 5:   Lesson Plan: Solving Quadratic Equations: Factoring

Objectives

Students will be able to

- find real roots to monic and non monic quadratic equations by factoring.

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Prerequisites

Students should already be familiar with

- rearranging quadratic equations,

- multiplying binomials,

- factoring quadratic expressions,

- set notation.

Exclusions

Students will not cover

- finding complex roots to quadratic equations,

- the quadratic formula,

- completing the square,

- solving quadratic equations graphically.

GUITAR BUILDING 2023

DAY 6: **Lesson Plan: Factoring Trinomials**

Objectives

Students will be able to

- factor expressions that contain a common binomial factor into a product of two binomials,

- fully factor simple quadratic and other single or two-variable trinomial expressions (whose leading terms have a coefficient of 1 or −1) into a product of two binomials,

- fully factor quadratic and other single or two-variable trinomial expressions (whose leading terms have a coefficient greater than 1 or less than −1) into a product of two binomials,

- solve geometric problems involving factoring trinomial expressions.

Prerequisites

Students should already be familiar with

- factoring numerical expressions into products of factors,

- factoring simple algebraic expressions by identifying the highest common factor of two or more terms.

Exclusions

Students will not cover

- perfect square trinomials,

- the difference of two squares,

- polynomials with more than three terms.

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DAY 6: 07.17.23 Lesson Plan: Factoring Trinomials

Objectives

Students will be able to

- factor expressions that contain a common binomial factor into a product of two binomials,
- fully factor simple quadratic and other single or two-variable trinomial expressions (whose leading terms have a coefficient of 1 or −1) into a product of two binomials,
- fully factor quadratic and other single or two-variable trinomial expressions (whose leading terms have a coefficient greater than 1 or less than −1) into a product of two binomials,
- solve geometric problems involving factoring trinomial expressions.

Prerequisites

Students should already be familiar with

- factoring numerical expressions into products of factors,
- factoring simple algebraic expressions by identifying the highest common factor of two or more terms.

Exclusions

Students will not cover

- perfect square trinomials,
- the difference of two squares,
- polynomials with more than three terms.

GUITAR BUILDING 2023

DAY 7:

Objectives

- Students will learn the characteristics and properties of quadratic equations and their graphs. They will learn how to:

  transition between the different representations of quadratic equations (equation, table, graph, and context).

- solve quadratic functions using factoring methods and the quadratic formula.

- apply the solving techniques learned in the unit to real-life situations and how to decide what technique would be most appropriate in a situation.

- interpret solutions to real-life problems and explain which solutions are reasonable for the situation.

Essential Questions

- How can we show that algebraic properties and processes are extensions of arithmetic properties and processes and how can we use algebraic properties and processes to solve problems?

- What functional representation would you choose to model a real-world situation and how would you explain your solution to the problem?

GUITAR BUILDING 2023

Day 8:
Objectives
Students will learn how to solve quadratic equations using the quadratic formula.

Students will

- understand that the quadratic formula can be used on any quadratic equation.
- be expected to work with solutions in the form of integers, fractions, and radicals.
- explore the significance of using the quadratic formula when solving real-life problems.

Essential Questions
- How can we use algebraic properties and processes to solve problems?
- What functional representations would you choose to model a real-world situation, and how would you explain your solutions to the problem?

Vocabulary
- **Prime:** A number that has two and only two factors, one and itself. **Quadratic Formula:** $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$;an algorithm for computing the roots of a quadratic equation.

Prerequisite Skills
Students should already be familiar with quadratic equations

Materials
- Quadratic Formula Independent Practice Worksheet
- Concept Ladder Quadratic Formula Quadratic Formula Follow-up Worksheet

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Day 9:

Objectives

- All students should be able to solve a pair of equations simultaneously using the method of elimination given equal coefficients of one unknown.

- Most students should be able to solve a pair of equations simultaneously using the method of elimination, where one coefficient is a factor of the other.

- Some students should be able to derive and solve a pair of equations simultaneously using the method of elimination where one coefficient is a factor of the other.

Prerequisites

Students should already be familiar with

- Eliminating one of the variables from the system.

- Eliminate a variable by setting both equations equal to the same variable, then writing the expressions equal to one another.

- Eliminate a variable by multiplying each term of an equation by the same constant to make an equivalent equation.

- Using the equivalent equation to eliminate one of the variables and solve the system. Once a solution has been found, verify the solution graphically or by substitution.

Exclusions:

Students will not cover:

- Substitution method