

PROGRAM OVERVIEW

Tables of Contents for Instructional Units

Unit 1: Quadratics Revisited

Lesson 1: Working with the Number System

Lesson 1.1.1: Defining, Rewriting, and Evaluating Rational Exponents

Lesson 1.1.2: Rational and Irrational Numbers and Their Properties

Conceptual Activities

GeoGebra. “Rational Exponents.” 10 Minutes Applet

GeoGebra. “Classifying Rational Numbers.”

Conceptual Task

Rational Decisions

Lesson 2: Operating with Complex Numbers

Lesson 1.2.1: Defining Complex Numbers, i , and i^2

Lesson 1.2.2: Adding and Subtracting Complex Numbers

Lesson 1.2.3: Multiplying Complex Numbers

Conceptual Activities

GeoGebra. “Addition of Complex Numbers.”

GeoGebra. “Multiplication of complex numbers—addition of arguments.”

GeoGebra. “Algebra of Complex Numbers.”

Conceptual Task

Give Me an Operator

Lesson 3: Fundamental Theorem of Algebra

Lesson 1.3.1: Extending Polynomial Identities to Include Complex Numbers

Lesson 1.3.2: Solving Quadratic Equations with Complex Solutions

Conceptual Activities

Khan Academy. “Adding and Subtracting Complex Numbers.”

GeoGebra. “Quadratic Equation: Complex Roots.”

Illustrative Mathematics. “Completing the square.”

Illustrative Mathematics. “Complex Square Roots.”

Unit 1 Assessment

Station Activities

Set 1: Operations with Complex Numbers

Set 2: Solving Quadratics

PROGRAM OVERVIEW

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Unit 2: Operations with Polynomials

Lesson 1: Polynomial Structures and Operating with Polynomials

Lesson 2.1.1: Structures of Expressions

Lesson 2.1.2: Adding and Subtracting Polynomials

Lesson 2.1.3: Multiplying Polynomials

Lesson 2.1.4: The Binomial Theorem

Conceptual Activities

GeoGebra. “Multiplying Binomials.”

Desmos. “Polygraph—Polynomial Functions.”

Desmos. “Constructing Polynomials.”

Desmos. “Polynomial Equation Challenges.”

Conceptual Task

Debating Polynomials

Lesson 2: Functions and Modeling

Lesson 2.2.1: Building Functions from Context

Lesson 2.2.2: Operating on Functions

Lesson 2.2.3: Composition of Functions

Conceptual Activity

GeoGebra. “Function Composition: Dynamic Illustrator (2).”

Conceptual Task

Composition Notation

Lesson 3: Inverse Functions

Lesson 2.3.1: Finding Inverse Functions

Lesson 2.3.2: Determining Inverses of Quadratic Functions

Lesson 2.3.3: Determining Inverses of Other Functions

Conceptual Activity

GeoGebra. “Inverse Relations: Graphs.”

Conceptual Task

Fuel Economy and Inverse Functions

Unit 2 Assessment

Station Activities

Set 1: Inverse Functions

PROGRAM OVERVIEW

Tables of Contents for Instructional Units

Unit 3: Polynomial Functions

Lesson 1: Polynomial Identities

Lesson 3.1.1: Introduction to Polynomial Identities

Lesson 3.1.2: Complex Polynomial Identities

Lesson 2: Graphing Polynomial Functions

Lesson 3.2.1: Describing End Behavior and Turns

Lesson 3.2.2: The Remainder Theorem

Lesson 3.2.3: Finding Zeroes

Lesson 3.2.4: The Rational Root Theorem

Conceptual Activities

GeoGebra. “Function Behavior.”

GeoGebra. “Make Your Own.”

GeoGebra. “Polynomial End Behavior.”

GeoGebra. “Relative Extrema Illustrator.”

Conceptual Tasks

Engineering Polynomials

Practicing Polynomials

Unit 3 Assessment

Station Activities

Set 1: Polynomial Functions

Unit 4: Rational and Radical Relationships

Lesson 1: Operating with Rational Expressions

Lesson 4.1.1: Structures of Rational Expressions

Lesson 4.1.2: Adding and Subtracting Rational Expressions

Lesson 4.1.3: Multiplying Rational Expressions

Lesson 4.1.4: Dividing Rational Expressions

Conceptual Activity

GeoGebra. “Simplifying rational expressions and stating restrictions.”

Conceptual Task

Rationalizing Rational Functions

Lesson 2: Creating and Graphing Rational Equations and Inequalities

Lesson 4.2.1: Creating Rational Equations

Lesson 4.2.2: Graphing Rational Equations

Lesson 4.2.3: Creating Rational Inequalities

Lesson 3: Solving Rational and Radical Equations

Lesson 4.3.1: Solving Rational Equations

Lesson 4.3.2: Solving Radical Equations

Lesson 4.3.3: Solving Systems of Equations

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Conceptual Activities

Desmos. “Marbleslides: Rationals.”

Desmos. “Polygraph: Rational Functions.”

GeoGebra. “Graphs of Radical Functions.”

GeoGebra. “Investigating Rational Functions.”

GeoGebra. “Rational Function End Behavior.”

Conceptual Task

Free Fall

Unit 4 Assessment

Station Activities

Set 1: Rational Expressions and Equations

Set 2: Solving Systems of Equations

Unit 5: Exponential and Logarithmic Functions

Lesson 1: Analyzing Functions

Lesson 5.1.1: Analyzing Exponential Functions

Lesson 5.1.2: Comparing Properties of Functions Given in Different Forms

Lesson 2: Modeling Logarithmic Functions

Lesson 5.2.1: Logarithmic Functions as Inverses

Lesson 5.2.2: Common Logarithms

Lesson 5.2.3: Natural Logarithms

Lesson 5.2.4: Graphing Logarithmic Functions

Lesson 5.2.5: Interpreting Logarithmic Models

Conceptual Activities

GeoGebra. “Logarithmic Action (2)!”

GeoGebra. “Logarithmic Action (3: V_2).”

GeoGebra. “Logarithmic Action (4)! V_2 .”

Conceptual Task

Logs from Trees

Unit 5 Assessment

Answer Key

Teacher Resource/Student Workbook

PROGRAM OVERVIEW

Tables of Contents for Instructional Units

Unit 6: Mathematical Modeling

Lesson 1: Creating Equations

Lesson 6.1.1: Creating Equations in One Variable

Lesson 6.1.2: Representing and Interpreting Constraints

Lesson 6.1.3: Rearranging Formulas

Lesson 2: Transforming a Model and Function Symmetry

Lesson 6.2.1: Transformations of Parent Graphs

Lesson 6.2.2: Recognizing Odd and Even Functions

Conceptual Task

Temperature Transformations

Lesson 3: Comparing Properties Within and Between Functions

Lesson 6.3.1: Reading and Identifying Key Features of Real-World Situation Graphs

Lesson 6.3.2: Calculating Average Rates of Change

Lesson 6.3.3: Comparing Functions

Conceptual Task

Fitted Functions for Fuel Consumption

Lesson 4: Choosing a Model

Lesson 6.4.1: Linear, Exponential, and Quadratic Functions

Lesson 6.4.2: Piecewise, Step, and Absolute Value Functions

Lesson 6.4.3: Square Root and Cube Root Functions

Conceptual Task

Modeling with Data

Lesson 5: Solving Systems of Equations

Lesson 6.5.1: Solving Systems of Equations Graphically

Lesson 6: Geometric Series

Lesson 6.6.1: Geometric Sequences

Lesson 6.6.2: Sum of a Finite Geometric Series

Conceptual Activities

Khan Academy. “Use geometric sequence formulas (practice).”

Khan Academy. “Extend geometric sequences: negatives & fractions.”

Unit 6 Assessment

Station Activities

Set 1: Choosing a Model

PROGRAM OVERVIEW

Tables of Contents for Instructional Units

Unit 7: Inferences and Conclusions from Data

Lesson 1: Working with a Single Measurement Variable

Lesson 7.1.1: Representing Data Sets

Lesson 7.1.2: Comparing Data Sets

Lesson 7.1.3: Interpreting Data Sets

Lesson 2: Using the Normal Curve

Lesson 7.2.1: Normal Distributions and the 68–95–99.7 Rule

Lesson 7.2.2: Standard Normal Calculations

Lesson 7.2.3: Assessing Normality

Conceptual Activities

GeoGebra. “192 Normal Distribution Simulation: Bike & Wall.”

GeoGebra. “Algebra 2 Lesson 7.”

GeoGebra. “Normal Curve Demonstration.”

Illustrative Math. “Normal Distributions.”

Illustrative Mathematics. “Should We Send Out a Certificate?”

Conceptual Task

Tons of Tuna

Lesson 3: Populations Versus Random Samples and Random Sampling

Lesson 7.3.1: Differences Between Populations and Samples

Lesson 7.3.2: Simple Random Sampling

Lesson 7.3.3: Other Methods of Random Sampling

Conceptual Activities

GeoGebra. “Sampling from a population of ordered pairs.”

Lesson 4: Surveys, Experiments, and Observational Studies

Lesson 7.4.1: Identifying Surveys, Experiments, and Observational Studies

Lesson 7.4.2: Designing Surveys, Experiments, and Observational Studies

Conceptual Task

Studying Shoppers

Lesson 5: Estimating Sample Proportions and Sample Means

Lesson 7.5.1: Estimating Sample Proportions

Lesson 7.5.2: The Binomial Distribution

Lesson 7.5.3: Estimating Sample Means

Lesson 7.5.4: Estimating with Confidence

Conceptual Activities

GeoGebra. “Binomial Distribution with Normal Approximation.”

GeoGebra. “Student-t vs. Z.”

Conceptual Task

Tracking Ticks

Lesson 6: Comparing Treatments and Reading Reports

Lesson 7.6.1: Evaluating Treatments

Lesson 7.6.2: Designing and Simulating Treatments

Lesson 7.6.3: Reading Reports

Conceptual Activities

GeoGebra. “Simulating a Bengal’s Season.”

GeoGebra. “Simulation (2012 #4).”

GeoGebra. “Simulation (2012 #5).”

GeoGebra. “Simulation (2015 #2).”

GeoGebra. “Simulation (2015 #4).”

Unit 7 Assessment

Station Activities

Set 1: z-scores

Set 2: Distributions and Estimating with Confidence