

Math 7
Revised 2018-2019

Topic 1: Integers and Rational Numbers

Topic Overview: Topic 1 focuses on applying the number sense learned in Grade 6 to extending operations with integers and fractions.

Standards:

CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.

Essential Question (Core Concepts)

How can the properties of operations be used to solve problems involving integers and rational numbers?

Objectives (Skills/Knowledge)

- Understand how integers and their opposites are related
- Identify rational numbers and write them in decimal form
- Add positive and negative integers
- Model integer addition in real-life applications
- Understand subtraction of integers as adding the additive inverse, $p - q = p + (-q)$
- Use properties of operations to add and subtract rational numbers
- Multiply positive and negative integers
- Apply integer multiplication to real-life applications
- Find the product of rational numbers
- Understand how to divide integers by applying the rules of multiplying integers
- Determine equivalencies among integer quotients
- Understand how the signs of integers in a multiplication sentence relate to the signs in a related division statement
- Decide which operations to use to solve problems
- Use precision when solving problems with rational numbers

Vocabulary

Additive Inverse
Complex Fraction
Multiplicative Inverse
Repeating Decimal
Terminating Decimal

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
- Reteach to Build Understanding Worksheets
- Math XL
- Additional Worksheets and manipulatives used as needed
- Other relevant activities and online programs as needed

Assessments

Pre-Practice Test, Vocabulary Quiz, Topic Quiz, Topic Assessment

Additional Resources

Edpuzzle, Peardeck, Quizlet, Kahoot, Quizizz, Youtube Educational Videos

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Topic 2: Analyze and Use Proportional Relationships

Topic Overview: Topic 2 focuses on extending the ratio reasoning of Grade 6 to recognizing and representing proportional relationships in verbal descriptions, tables, equations, and graphs.

Standards:

CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.

Essential Question (Core Concepts)

How can you recognize and represent proportional relationships and use them to solve problems?

Objectives (Skills/Knowledge)

- Use ratios and rates to describe the relationship between two quantities
- Find equivalent ratios and use unit rates to solve multi-step problems
- Find unit rates with ratios of fractions
- Use unit rates to solve multi-step problems
- Determine whether quantities are proportional by testing for equivalent ratios
- Use the constant of proportionality to write equations that represent proportional relationships
- Use equations to solve problems involving proportional relationships
- Use mathematical modeling to represent a problem situation and to propose a solution
- Test and verify the appropriateness of math models
- Explain why the results from mathematical models may not align exactly to the problem situation
- Use a graph to recognize proportionality
- Identify a constant of proportionality from a graph
- Interpret a point on a graph of a proportional relationship
- Explain whether a situation represents a proportional relationship
- Use representations to find entry points into problems

Vocabulary

Proportional Relationship

Proportion

Constant of Proportionality

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
- Reteach to Build Understanding Worksheets
- Math XL
- Additional Worksheets and manipulatives used as needed
- Other relevant activities and online programs as needed

Assessments

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Additional Resources

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Topic 3: Analyze and Solve Percent Problems

Topic Overview: Topic 3 focuses on extending the topic of ratios and proportions from Grade 6 to learning that a percent is a specific type of ratio or proportion that represents a part out of a whole, where the whole is measured in hundredths.

Standards:

CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems. Pennsylvania

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Essential Question (Core Concepts)

How can percents show proportional relationships between quantities and be used to solve problems?

Objectives (Skills/Knowledge)

- Understand that equivalent rates can be used to find percents
- Analyze percents of numbers in a real-world context
- Construct a percent proportion
- Use a percent proportion to find the unknown part, whole, or percent
- Understand the relationship between proportional reasoning and percent
- Interpret the results of a percent equation in a real-life scenario
- Solve real-world problems involving percent change and percent error
- Understand the percent equation and the different ways it can be used
- Understand and calculate markups and markdowns
- Relate percent change to percent markup and percent markdown
- Identify the parts of interest problems and how the values are related
- Understand what simple interest is and how it is calculated

Vocabulary

Interest Rate

Markdown

Markup

Percent Change

Percent Equation

Percent Error

Percent Markdown

Percent Markup

Principal

Simple Interest

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
- Reteach to Build Understanding Worksheets
- Math XL
- Additional Worksheets and manipulatives used as needed
- Other relevant activities and online programs as needed

Assessments

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Additional Resources

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Topic 4: Generate Equivalent Expressions

Topic Overview: Topic 4 focuses on extending the use of properties of operations from writing and evaluating algebraic expressions to analyzing equivalent expressions.

Standards:

CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.

Essential Question (Core Concepts)

How can the properties of operations help to generate equivalent expressions that can be used in solving problems?

Objectives (Skills/Knowledge)

- Understand how variables are used to represent unknown values in problems
- Recognize when two expressions are equivalent
- Use properties of operations to write equivalent expressions
- Combine like integers and rational terms
- Use the Distributive Property to expand expressions
- Understand expanding an expression is the reverse of factoring
- Identify the GCF of algebraic terms in expressions
- Use properties of operations to add expressions
- Model addition of expressions in real-life applications
- Use properties of operations to subtract expressions
- Model subtraction of expressions in real-life applications
- Write equivalent expressions to show how quantities are related in real-life applications

Vocabulary

Variables

GCF

Equivalent

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
- Reteach to Build Understanding Worksheets
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Topic 5: Solve Problems Using Equations and Inequalities

Topic Overview: Topic 5 focuses on extending the students' understanding of the relationship between the independent and dependent variables.

Standards:

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Essential Question (Core Concepts)

How can you solve real-world and mathematical problems with numerical and algebraic equations and inequalities?

Objectives (Skills/Knowledge)

- Analyze word problems to write two-step equations
- Understand the relationship between the terms of the equation and the values they represent
- Use models to solve two-step equations
- Compare algebraic and arithmetic
- Solve equations using the Distributive Property
- Graph the solution of inequalities on a number line
- Solve inequalities using the Addition and Subtraction Properties of Inequality
- Write inequalities and solve them using Multiplication and Division Properties of Inequality
- Graph the solutions of an inequality on a number line
- Use mathematical modeling to represent a problem situation and to propose a solution
- Test and verify the appropriateness of their mathematical models
- Write and solve a two-step inequality to solve a problem
- Solve an inequality by multiplying or dividing by a negative rational number
- Explore the relationship between two-step inequalities and multi-step inequalities
- Apply the Distributive Property to simplify and solve multi-step inequalities

Vocabulary

Isolate the Variable

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
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- Additional Worksheets and manipulatives used as needed
- Other relevant activities and online programs as needed

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Topic 6: Use Sampling to Draw Inferences About Populations

Topic Overview: Topic 6 focuses on extending students' understanding of how to display, describe, and summarize numerical data by introducing the concepts of populations and samples, making inferences about a population using a sample, and how to informally compare two populations.

Standards:

CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.

CC.2.4.7.B.2 Draw informal comparative inferences about two populations.

Essential Question (Core Concepts)

How can sampling be used to draw inferences about one or more populations?

Objectives (Skills/Knowledge)

- Distinguish between a population and a sample
- Establish whether a sample is representative of a population
- Generate random samples
- Make qualitative inferences from a sample data set
- Make estimates about a population based on a sample data set, and assess whether the inferences are valid
- Use box plots to compare and make inferences about populations
- Use the median and IQR of datasets to informally compare and make inferences about two populations
- Use the mode, range, mean, and mean absolute deviation (MAD) to compare populations
- Use mathematical modeling to represent a problem situation and propose a solution
- Test and verify the appropriateness of their math models
- Explain why the results from their mathematical models may not align exactly to the problem situation

Vocabulary

Random Sample

Representative Sample

Valid Inference

IQR

MAD

Suggested Activities/Strategies/Study Skills

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- Other relevant activities and online programs as needed

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Topic 7: Probability

Topic Overview: Topic 7 focuses on applying the data analysis learned in Grade 6 to extend an understanding of how data is used to determine the probability of an event occurring.

Standards:

CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.

Essential Question (Core Concepts)

How can you investigate chance processes and develop, use, and evaluate probability models?

Objectives (Skills/Knowledge)

- Use probability to describe the likelihood that an event will occur
- Relate probability to mathematical fairness
- Understand theoretical probability and how it can be used
- Use theoretical probability to predict an outcome
- Compare theoretical and experimental probability
- Use experimental probability to make predictions
- Explain differences between theoretical and experimental probability
- Develop a probability model
- Use a probability model to evaluate a situation
- Use probability model to make an estimate
- Use mathematical modeling to represent a problem situation and to propose a solution
- Test and verify the appropriateness of their math models
- Explain why the results from their mathematical models may not align exactly to the problem situation
- Use a tree diagram, a table, or an organized list to represent the sample space for a compound event
- Organize information about a compound event on a table, a tree diagram, or an organized list
- Find the probability of a compound event
- Use different tools to simulate a compound event
- Model a real-world situation involving a compound event and predict its outcome using a simulation

Vocabulary

Outcomes

Probability

Event

Theoretical Probability

Experimental Probability

Relative Frequency

Sample Space

Probability Model

Compound Event

Simulation

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
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Topic 8: Solve Problems Involving Geometry

Topic Overview: Topic 8 focuses on extending the ratio reasoning of Grade 6 to representing proportional relationships in scale drawings. Topic 8 also extends students' understanding of area from Grade 6 to include solving problems involving circumference and area of circles, as well as finding surface area and volume of two-dimensional and three-dimensional figures.

Standards:

CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.

CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

Essential Question (Core Concepts)

How can geometry be used to solve problems?

Objectives (Skills/Knowledge)

- Use a scale drawing as a representation of actual lengths and area
- Sketch quadrilaterals with given conditions
- Name and classify quadrilaterals according to their properties
- Construct triangles with given conditions
- Conclude whether or not a triangle is formed and what type of triangle it is
- Calculate the measures of angles by using angle relationships
- Calculate the circumference, radius, or diameter of a circle
- Recognize the relationship between the circumference and the diameter of a circle and π
- Find the area of a circle
- Use the area to find the radius and diameter
- Solve problems involving the area of a circle
- Use mathematical modeling to represent a problem situation and to propose a solution
- Test and verify the appropriateness of their mathematical models
- Describe cross sections of right rectangular prisms and pyramids
- Solve problems involving cross sections
- Find the surface area of two-dimensional composite shapes
- Find the surface area of three-dimensional composite shapes
- Calculate the volume of various three-dimensional figures
- Solve problems involving the volume of three-dimensional figures

Vocabulary

Scale Drawing

Adjacent Angles

Complementary Angles

Supplementary Angles

Vertical Angles

Circumference

Cross Section

Composite Figure

Suggested Activities/Strategies/Study Skills

- Using EnVisions Textbook
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