2022-2023

Special Education Bridge to Algebra Course Guide

#7767/7768 Bridge to Algebra

(This is a one-year course offered by the Special Education Department to prepare SPED students for Algebra 1)

Bridge to Algebra Pacing

Chapter - Topic	Days	Chapter - Topic	Days
1 – The Language of Algebra	22	5 – Ratio, Proportion & Similar Figures	25
2 – Operations with Integers	17	6 – Percents	16
Fall Break		Spring Break	
3 – Operations w/Rational Numbers	21	7 – Algebraic Expressions	16
4 – Powers and Roots	18	8 – Equations and Inequalities	27
End of Semester 1		End of Semester 2	

SPED Bridge to Algebra

The Language of Algebra – Ch. 1		
Lessons	Resources	Days
A Plan for Problem Solving	Example 1, 2	1
Words and Expressions	Example 1, 2, 3	3
Inquiry Lab: Rules and Exponents	Toothpicks	1
Variables and Expressions	Example 1, 2, 3, 4	3
Properties of numbers	Example 2, 3	2
Problem Solving Strategies	Example 1, 2, 3, 4	2
Ordered Pairs and Relations	Example 1, 2, 3, 4	4
Words, Equations, Tables	Example 1, 2	4
Review and Test		2
		Total = 22

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
*7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Use properties of operations to generate equivalent expressions.	
*7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
*7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
*7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
*7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p, q,$ and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p, q,$ and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

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Operations with Integers – Ch. 2		
Lessons	Resources	Days
Integers and Absolute Value	Examples 1 - 5	2
Inquiry Lab: Adding Integers	Algebra Tiles	1
Adding Integers	Examples 1 - 5	2
Inquiry Lab: Subtracting Integers	Algebra Tiles	1
Subtracting Integers	Example 1 - 4	2
Inquiry Lab: Multiplying Integers	Algebra Tiles	1
Multiplying Integers	Example 1 - 6	2
Dividing Integers	Example 1 - 4	2
Graphing in Four Quadrants	Example 1 - 3	2
Review and Test		2
Be Here By Fall Break		**Total = 17**

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
*7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. *a. Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. *b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. *c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. *d. Apply properties of operations as strategies to add and subtract rational numbers.
*7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. *a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. *b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts. *c. Apply properties of operations as strategies to multiply and divide rational numbers. *d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
*7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
*7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically.

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Operations with Rational Numbers – Ch. 3		
Lessons	Resources	Days
Inquiry Lab: Fractions and Decimals	Number Line	2
Fractions and Decimals (practice by hand and with a calculator)	Examples 1 - 5	3
Rational Numbers	Examples 1 – 4	2
Multiplying Rational Numbers (use area models, not tricks)	Examples 1 – 4	3
Dividing Rational Numbers (use strategies for division, not tricks)	Examples 1 - 5	3
Adding and Subtracting like Fractions	Examples 1 – 6	1
Adding and Subtracting unlike Fractions	Examples 1 - 4	5
Review and Test		2
		Total = 21

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
*7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. *a. Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. *b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. *c. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. *d. Apply properties of operations as strategies to add and subtract rational numbers.
*7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. *a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. *b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real world contexts. *c. Apply properties of operations as strategies to multiply and divide rational numbers. *d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
*7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Know that there are numbers that are not rational, and approximate them by rational numbers.	
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; rational numbers show that the decimal expansions repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

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Powers and Roots – Ch. 4		
Lessons	Resources	Days
Powers and Exponents	Examples 1 – 3	2
Negative Exponents	Examples 1 – 4	2
Multiplying and Dividing Monomials	Examples 1 – 5	2
Scientific Notation	Examples 1 – 5	2
Compute with Scientific Notation	Examples 1 – 4	2
Inquiry Lab: Scientific Notation Using Technology	Calculator	2
Square Roots	Examples 1 - 3	2
The Real Number System	Examples 1 – 3, 4a	2
Review and Test		2
Be Here By End of Semester 1		**Total = 18**

Know that there are numbers that are not rational, and approximate them by rational numbers.	
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; rational numbers show that the decimal expansions repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
Work with radicals and integer exponents.	
*8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$
8.EE.2	Use the square foot and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 10^8 and the population of the world as 7 × 10^9, and determine that the world population is more than 20 times larger.
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

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Ratio, Proportion, and Similar Figures – Ch. 5		
Lessons	Resources	Days
Ratios (discuss equivalence that they may not know, 12 inches = 1 foot….)	Examples 1 – 3	3
Unit Rates (Use double number lines from grade 6 to assist with reasoning)	Examples 1 – 3	4
Complex Fractions and Unit Rates	Examples 1 – 4	4
Proportional and Nonporportional Relationships	Examples 1 – 3	2
Graphing Proportional Relationships	Examples 1 – 2	3
Solving Proportions (Use double number lines from grade 6)	Examples 1 – 3	4
Scale Drawings and Models	Examples 1 – 3	3
Don't teach Lessons 5.4, 5.9, 5.10		
Review and Test		2
		Total = 25

Analyze proportional relationships and use them to solve real-world and mathematical problems.	
*7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2**/**1/4 miles per hour, equivalently 2 miles per hour
*7.RP.2	Recognize and represent proportional relationships between quantities. *a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. *d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
*7.RP.3	Use proportional relationships to solve multistep ratio and percent problems.
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
*7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Draw, construct, and describe geometrical figures and describe the relationships between them.	
*7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

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Percents – Ch. 6		
Lessons	Resources	Days
Inquiry Lab: Percent Models	Double number lines	2
Using the Percent Proportion	Examples 1 – 4	2
Find Percent of a Number Mentally	Examples 1 - 5	2
Using the Percent Equation (make use of double number lines for understanding)	Examples 1 – 5	2
Inquiry Lab: Percent of Change	Double number lines	1
Percent of Change	Examples 1 – 3	2
Discount and Markup	Examples 1 - 4	3
Don't teach Lessons 6.5, 6.6		
Review and Test		2
Be Here By Spring Break		**Total = 16**

Analyze proportional relationships and use them to solve real-world and mathematical problems.	
*7.RP.2	Recognize and represent proportional relationships between quantities. *a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *c. Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. *d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
*7.RP.3	Use proportional relationships to solve multistep ratio and percent problems.
Use properties of operations to generate equivalent expressions.	
*7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
*7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an7ndistrinal 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

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Algebraic Expressions – Ch. 7		
Lessons	Resources	Days
The Distributive Property	Examples 1 – 4	1
Inquiry Lab: Simplifying Algebraic Expressions	Algebra Tiles	2
Simplifying Algebraic Expression	Examples 1 – 4	3
Adding Linear Expressions (with Algebra Tiles)	Examples 1 – 3	2
Subtracting Linear Expressions (with Algebra Tiles)	Examples 1 – 3	2
Inquiry Lab: Factoring Linear Expressions (undistribute)	Algebra Tiles	2
Factoring Linear Expressions (with Algebra Tiles)	Examples 1 – 2	2
Review and Test		2
		Total = 16

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
*7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. *a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. *b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts. *c. Apply properties of operations as strategies to multiply and divide rational numbers. *d. **Convert a rational number to a decimal** using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
Use properties of operations to generate equivalent expressions.	
*7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
*7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."

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Equations and Inequalities – Ch. 8		
Lessons	Resources	Days
Solving Equations with Rational Coefficients	Examples 1 – 3	3
Inquiry Lab: Solving Two-Step Equations	Algebra Tiles	3
Solving Two-Step Equations (with Algebra Tiles)	Examples 1 – 5	3
Writing Equations	Examples 1 – 3	3
Inquiry Lab: More Two-Step Equations	Algebra Tiles	1
More Two-Step Equations (with Algebra Tiles)	Examples 1 – 3	2
Inquiry Lab: Solving Equations with Variables on Each Side	Algebra Tiles	1
Solving Equations with Variables on Each Side (with Algebra Tiles)	Examples 1 – 3	2
Inequalities (with Number Lines)	Examples 1 - 5	2
Solving Inequalities (with Number Lines)	Examples 1 - 3	2
Solving Multi-Step Equations	Examples 1 & 2	3
Review and Test		2
Be here by End of Semester 2		**Total = 27**

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
*7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p, q,$ and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p, q,$ and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.
*8.EE.7	Solve linear equations in one variable. *a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). *b. Solve linear equations with **rational number coefficients**, including equations whose solutions require expanding expressions using the distributive property and collecting like terms