DISCLAIMERS

The College and Career Readiness Standards document below contains links to other websites, all of which are revised from time to time. *Laurens County Adult Education is neither responsible for the content of these links nor the current availability of the links.*

Some of the online links may take the teacher to a Common Core website that offers free worksheets. The teacher should always vet the worksheet before assigning it to students. Anyone who follows the news or social media has seen ridiculous Common Core math problems on worksheets that elementary school teachers have sent home with students for homework. Examine all worksheets closely to see that they will be effective for adult students before you decide to print and use them.

These documents are not perfect. They are merely intended to give the teacher a starting point for each standard.

Please send any corrections that need to be addressed to Anita Wilson at awilson@laurens55.org.

Constructive feedback is also welcomed.

Using the College and Career Readiness Standards Documents

1. Every document is formatted so that each standard is presented on exactly one page. Because of this formatting, the print size will differ from page to page depending on the length of the standard or the number of print or online resources aligned with the standard. Font sizes will range from 9 to 12, with most being either 10 or 11.

2. The list of print resources is merely a starting point. Included are the most commonly used books here at Laurens County Adult Education for the 2014 series GED® tests. Other resources include the Contemporary books, the Steck-Vaughn GED books, the Number Power series, etc., that were used for the 2002 series GED® tests. All of the Laurens County Adult Education sites will have some, but perhaps not all, of those additional resources since books have disappeared over the years and the older books have not been replaced. Some of the print resources are closely aligned, but many may be loosely aligned.

3. The list of online resources is also merely a starting point. As with print resources, some online resources are better than others. The teacher should always vet a website before sending students to that website. Khan Academy (Mathematics) and Learnzillion often include videos to explain the standard. Note that the links included in each document will take the teacher to a "home page" for each standard. Khan Academy, for example, may have several links under each standard, and when the teacher clicks on each link, the teacher will find several lessons to address the standard. Feel free to explore each website to determine lessons that best suit individual students.

4. The reading level for some of the print resources may be above the reading level of some of the students in your class who are on the High Intermediate Level. The teacher may find the print resources useful for generating ideas for lessons for weaker readers.

5. The iPad resources mostly include the "Maths" app by Your Teacher. There is a "Fraction Math" app that can be useful for the low intermediate student.

For example, the directions on the iPad resources may look something like this:

Maths app >> **Pre-Algebra** >> Chapter 3: Fractions >> Multiples and Least Common Multiple

To reach this lesson, tap the "Maths App" folder at the bottom of the iPad. Then tap on "Maths." The home screen offers four courses (Pre-Algebra, Algebra 1, Geometry, and Algebra 2). Select "Pre-Algebra." Then select "Chapter 3: Fractions." The screen will open up to give you multiple topics. Select "Multiples and Least Common Multiple."

The Fraction Math app opens up with a menu of five selections (Settings, Set, New, Terms, and Tip). Start with "Settings." A new menu opens up to let the teacher select addition, subtraction, multiplication, division, or any combination of the four operations by sliding the button beside each symbol. The teacher may then determine whether to allow only the same denominators, allow whole numbers, allow mixed numbers, allow negative numbers, or allow big numbers (greater than 12). Each lesson can be customized to fit the individual student's needs.

The Number System

Apply and extend previous understandings of numbers to the system of rational numbers.

Standard 6.NS.5 **Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.**

Background knowledge needed

Understanding of the concept of the number 0
Understanding of the concept of whole numbers
Understanding of the concepts of left/right, up/down

iPad resources

Maths app >> Pre-Algebra >> Chapter 1 – Whole Numbers >> Place Value
>> Chapter 2 – Integers >> Intro to Integers
>> Opposites & Absolute Value

Print resources

1. GED Skill Book: Mathematics – Number Operations and Algebra, Lesson 6

2. Common Core Basics: Mathematics, Lesson 4.1

3. Steck-Vaughn Student Workbook: Mathematics – Unit 1, Lesson 3

4. McDougal-Littlell Algebra 1, Lesson 2.1

Online resources

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.5

https://learnzillion.com/lessonsets/94-understand-how-positive-and-negative-numbers-describe-quantities

https://learnzillion.com/lessonsets/447-understand-the-relationship-between-positive-and-negative-numbers-interpret-zero-and-positive-or-negative-numbers-in-real-world-contexts

https://quizlet.com/60865486/integers-flash-cards/

www.ixl.com/math/grade-6 (Click on Integers)

https://www.illustrativemathematics.org/content-standards/6/NS/C/5

Career Ready 101, Applied Math Level 3 – Positive and Negative Numbers

The Number System

Apply and extend previous understandings of numbers to the system of rational numbers.

Standard 6.NS.6 **Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.**

6.NS.6a **Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite.**

Background knowledge needed

Understanding of the concept of the number 0
Understanding of the concept of whole numbers
Understanding of the concepts of left/right
Understanding of the concept of the number line

iPad resources

Maths app >> Pre-Algebra >> Chapter 2 – Integers >> Intro to Integers

MathPro!!! >> Grade 6 Math, Objective 1: Decimals and Fractions >> Chapter 8

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 218 – 219
2. Common Core Basics, Lesson 4.1
3. McDougal-Littlell Algebra 1, Lesson 2.1

Online resources

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.6

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.6a

https://learnzillion.com (Enter search for standard 6.NS.6)

www.quizlet.com (Enter search for coordinate plane)

www.ixl.com/math/grade-6 (Click on Coordinate Graphs)

https://www.illustrativemathematics.org/content-standards/6/NS/C/6

Career Ready 101, Applied Math Level 3 – Positive and Negative Numbers

The Number System

Apply and extend previous understandings of numbers to the system of rational numbers.

Standard 6.NS.6 **Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.**

6.NS.6b **Understand signs of numbers of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.**

6.NS.6c **Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.**

Background knowledge needed

Understanding of horizontal (x- axis) and vertical (*y*-axis) number lines
Understanding of the concept of the origin as the intersection of the *x*-axis and *y*-axis as the ordered pair (0,0)

iPad resources

Maths app >> Algebra 1 >> Chapter 4 – Inequalities, Absolute Value, Functions, Graphing >> Coordinate System
MathPro!!! >> Pre-Algebra, Objective 15: Graphing Points >> Chapters 1 – 6

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics, Lesson 11

2. Common Core Basics, Lesson 4.5

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 11

4. Steck-Vaughn GED Mathematics (the red book), Unit 3, Lesson 22

5. McDougal-Littell Algebra 1, Lesson 4.1

6. Kaplan Big Book, Equations, Inequalities and Functions, Lesson 6

Online resources

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.6b

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.6c

https://learnzillion.com/lessonsets/230-understand-ordered-pairs-signs-and-the-coordinate-plane

https://learnzillion.com/lessonsets/676-understand-rational-numbers-and-ordered-pairs-place-pairs-of-rational-numbers-on-the-coordinate-plane

https://learnzillion.com/lessonsets/210-position-numbers-and-their-opposites-on-a-number-line

https://learnzillion.com/lessonsets/15-compare-fractions-to-1-2

https://quizlet.com/75166358/the-coordinate-plane-flash-cards/

www.ixl.com/math/grade-6 (Click on Coordinate Graphs)

https://www.illustrativemathematics.org/content-standards/6/NS/C/6

The Number System

Apply and extend previous understandings of numbers to the system of rational numbers.

Standard 6.NS.7 **Understand ordering and absolute value of rational numbers.**

6.NS.7a **Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.** *For example, interpret -3 > 7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.*

6.NS.7b **Write, interpret, and explain statements of order for rational numbers in real-world contexts.** *For example, write -3°C > -7°C to express the fact that -3°C is warmer than -7°C.*

6.NS.7c **Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.** *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars.*

6.NS.7d **Distinguish comparisons of absolute value from statements about order.** *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.*

Background knowledge needed

Understanding of the concepts of left/right and lesser/greater

iPad resources

Maths app >> Pre-Algebra >> Chapter 2 – Integers >> Comparing Integers
>>Opposites and Absolute Value

MathPro!!! >> Grade 6 Math, Objective 3: Integers and Divisibility Rules >> Absolute Value of Integers; also, Grade 7 Math, Objective 1: Comparing and Ordering Numbers >> Chapters 5 – 8, 11, 13, 14

Print resources

1. McDougal Littell Algebra 1, Lesson 2.1
2. Common Core Basics, Lesson 4.1
3. Steck-Vaughn Mathematical Reasoning, Unit 1, Lesson 3
4. Steck-Vaughn GED Math (the red book), pp. 218 – 219
5. Kaplan Big Book, Algebra Basics, Expressions and Polynomials, Lesson 6

Online resources

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.7

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.7a

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.7b

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.7c

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.7d

https://learnzillion.com/lessonsets/138-interpret-statements-of-inequality-and-write-interpret-and-explain-statements-of-order-for-rational-numbers

https://learnzillion.com/lessonsets/191-understand-and-interpret-absolute-value-and-distinguishing-comparisons-of-absolute-value-from-statements-about-order

https://learnzillion.com (Enter search for standards 6.NS.7, 6.NS.7a, 6.NS.7b, 6.NS.7c, and 6.NS.7d)

www.quizlet.com (Enter search for Absolute value and ordering of rational numbers)

www.ixl.com/math/grade-6 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/6/NS/C/7

Career Ready 101, Applied Math Level 3 – Positive and Negative Numbers

The Number System

Apply and extend previous understandings of numbers to the system of rational numbers.

Standard 6.NS.8 **Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.**

Background knowledge needed

Understanding of the coordinate plane: number lines, *x*-axis, *y*-axis, the origin, the four quadrants
Understanding how to find distances on a number line
Understanding how to add and subtract signed numbers

iPad resources

Maths app >> Algebra 1 >> Chapter 4 – Inequalities, Absolute Value, Functions, Graphing >> Coordinate System
Maths app >> Geometry >> Chapter 1 – Introduction >> Segments, Rays, & Length, video #5
MathPro!!! >> Grade 7 Math, Objective 12: Graphing >> Chapters 1 - 6

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics – Number Operations and Algebra, Lesson 11

2. McDougal Littell Algebra 1, Lesson 4.1

3. Steck-Vaughn GED Math (the red book), Unit 3, Lesson 22

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 11

4. Common Core Basics, Lesson 4.5

6. Kaplan Big Book, Equations, Inequalities, and Functions: Lesson 6

Online resources

https://www.khanacademy.org/commoncore/grade-6-NS#6.NS.C.8

https://learnzillion.com/lessonsets/192-graph-points-in-all-four-quadrants-on-the-coordinate-plane-to-solve-real-world-and-mathematical-problems

https://quizlet.com/75166358/the-coordinate-plane-flash-cards/

www.ixl.com/math/grade-6 (Click on Coordinate Graphs)

https://www.illustrativemathematics.org/content-standards/6/NS/C/8

http://www.commoncoresheets.com/SortedByGrade.php?Sorted=6ns8

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.1 **Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtractions on a horizontal or vertical number line diagram.**

7.NS.1a **Describe situations in which opposite quantities combine to make 0.** *For example, if a check is written for the same amount as a deposit, made to the same checking account, the result is a zero increase of decrease in the account balance.*

7.NS.1b **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.**

Background knowledge needed

Understanding of the concepts of opposites, 0, increase/decrease, and absolute value as being the distance from 0 on the number line

iPad resources

Maths app >> Pre-Algebra >> Chapter 2 – Integers >> Opposites and Absolute Value
>> Adding Integers

MathPro!!! >> Grade 6 Math, Objective 1: Decimals and Fractions >> Chapter 8

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics – Number Operations and Algebra, Lesson 6

2. McDougal Littell Algebra 1, Lessons 2.1 and 2.2

3. Common Core Basics Math, Lesson 4.1 and 4.2

4. Steck-Vaughn Mathematical Reasoning, Unit 1, Lesson 3

5. Steck-Vaughn GED Math (the red book), Unit 3, Lesson 18

6. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1a

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1b

https://learnzillion.com/lessonsets/418-describe-situations-in-which-opposite-quantities-combine-to-make-0

https://learnzillion.com/lessonsets/339-describe-situations-in-which-opposite-quantities-combine-to-make-0-understand-p-q-as-the-number-q-from-p

https://learnzillion.com/lessonsets/140-describe-situations-in-which-opposite-quantities-combine-to-make-0-understanding-p-q-as-the-number-q-from-p-1

https://quizlet.com/15498119/working-the-additive-inverse-in-math-flash-cards/

www.ixl.com/math/grade-7 (Click on Integers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/1

http://www.mathworksheetsland.com/7/10numbline.html

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.1 **Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtractions on a horizontal or vertical number line diagram.**

7.NS.1c **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.**

7.NS.1d **Apply properties of operations as strategies to add and subtract rational numbers.**

Background knowledge needed

Understanding absolute value and the rules for adding signed numbers
Understanding Least Common Multiples and Divisibility Rules for determining least common denominators for adding and subtracting fractions

iPad resources

Maths app >> Pre-Algebra course >> Chapter 2 – Integers >> Subtracting Integers
>> Chapter 3 – Fractions >> Lessons 1 - 17
Fraction Math app
MathPro!!! >> Grade 6 Math, Objective 6: Combining Fractions >> Chapters 1 - 4

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics – Number Operations and Algebra, Lesson 6
2. McDougal Littell Algebra 1, Lesson 2.3
3. Steck-Vaughn GED Math (the red book), Unit 3, Lesson 18
4. Common Core Basics Mathematics, Unit 2, Lesson 4.3
5. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lesson 1
6. TABE Fundamentals, Level D – Math Computation
7. Building Skills with TABE, Level D

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1c

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.1d

https://learnzillion.com/lessonsets/137-apply-properties-of-operations-to-add-and-subtract-rational-numbers-and-understanding-subtraction-of-rational-numbers-as-adding-the-additive-inverse

https://quizlet.com/46461661/adding-subtracting-rational-numbers-flash-cards/

www.ixl.com/math/grade-7 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/1

http://www.mathworksheetsland.com/7/10numbline.html

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.2 **Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.**

7.NS.2a 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.

Background knowledge needed

Understanding the concept of a fraction: numerator/denominator
Understanding how to reduce fractions
Knowledge of multiplication tables

iPad resources

Maths app >> Pre-Algebra >> Chapter 2 – Integers >> Multiplying Integers; Dividing Integers
>> Chapter 3 – Fractions >> Lessons 18 – 21

MathPro!!! >> Grade 6 Math, Objective 3: Integers and Divisibility Rules >> Chapter 4

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics – Number Operations and Algebra, Lesson 6
2. McDougal Littell Algebra 1, Lessons 2.5 and 2.7
3. Steck-Vaughn GED Math (the red book), Unite 3, Lesson 18
4. Steck-Vaughn Mathematical Reasoning, Unit 2, Lessons 2 – 4
5. Common Core Basics Math, Lessons 3.3 and 4.4
6. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lesson 1
7. TABE Fundamentals, Level D
8. Building Skills with TABE, Level D

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2a

https://learnzillion.com/lessonsets/179-understand-multiplication-of-rational-numbers-1

https://learnzillion.com/lessonsets/144-understand-multiplication-of-rational-numbers-2

https://learnzillion.com/lessonsets/362-multiply-and-divide-rational-numbers

https://quizlet.com/46461796/multiplying-dividing-rational-numbers-flash-cards/

www.ixl.com/math/grade-7 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/2

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.2 **Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.**

7.NS.2b **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.**

7.NS.2c **Apply properties of operations as strategies to multiply and divide rational numbers.**

Background knowledge needed

Understanding the relationship between multiplication (division is the same as multiplying the first number by the multiplicative inverse of the second number)

Understanding that, for every division fact, there is a corresponding multiplication fact (For example: 15 ÷ 3 = 5 because (3)(5) = 15), therefore, numbers aren't divisible by 0 because there is no corresponding multiplication fact (For example, 15 ÷ 0 is undefined because (0)(every number) = 0, not 15.

iPad resources

Maths app >> Pre-Algebra >> Chapter 3 – Fractions >> Multiplying Fractions; Dividing Fractions

Fraction Math app

MathPro!!! >> Grade 6 Math, Objective 3: Integers and Divisibility Rules >> Chapters 5 - 9

Print resources

1. Steck-Vaughn Access Mathematics, Lessons 3 and 7

2. McDougal Littell Algebra 1, Lessons 2.5 – 2.7

3. Steck-Vaughn GED Mathematics, Lessons 5, 7, and 10

4. Steck-Vaughn Mathematical Reasoning, Unit 1, Lessons 2 – 4

5. Common Core Basics, Lessons 3.3, 3.4, 4.4

6. Common Core Achieve, Lesson 1.2

7. Kaplan Big Book, Decimals and Fractions, Lesson 3 - 5

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2b

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2c

https://learnzillion.com/lessonsets/362-multiply-and-divide-rational-numbers

https://learnzillion.com/lessonsets/249-applying-properties-of-operations-to-multiply-and-divide-rational-numbers-1

https://learnzillion.com/lessonsets/253-apply-properties-of-operations-to-multiply-and-divide-rational-numbers-2

https://quizlet.com/50569402/dividing-rational-numbers-flash-cards/

www.ixl.com/math/grade-7 (Click on Rational Numbers and also Operations with Integers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/2

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.2 **Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.**

7.NS.2d **Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in zeroes or eventually repeats.**

Background knowledge needed

Understanding of the process of long division
Understanding of the concept of a fraction

iPad resources

Maths app >> Pre-Algebra >> Chapter 4 – Decimals >> Lessons 1 – 4, 19, 20

Division app (Settings: 1 digit in divisor; choose up to 5 digits in dividend; new problems = random; allow = decimals)

MathPro!!! >> Grade 6 Math, Objective 1: Decimals and Fractions >> Chapters 1 and 7

Print resources

1. Steck-Vaughn Access Mathematics, Lesson 8
2. Steck-Vaughn GED Mathematics, Lesson 10
3. Kaplan Big Book, Decimals and Fractions, Lesson 5
4. TABE Fundamentals, Level D – Math Computation
5. Building Skills with TABE, Level D

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.2d

https://learnzillion.com/lessonsets/790-convert-rational-numbers-to-decimals-using-divisions-understand-rational-numbers

https://learnzillion.com/lessonsets/600-convert-a-rational-number-to-a-decimal-using-long-division

https://learnzillion.com/lessonsets/240-convert-rational-numbers-to-decimals

https://quizlet.com/52673795/converting-fractions-to-decimals-flash-cards/

www.ixl.com/math/grade-7 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/2

http://www.mathworksheetsland.com/7/14decconv.html

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Standard 7.NS.3 **Solve real-world and mathematical problems involving the four operations with rational numbers.**

Background knowledge needed

Understanding of the processes of addition, subtraction, multiplication, and division of integers, fractions, and decimals

Understanding how to translate words to symbols (For example: *increased by* means +; *decreased by* means -; *twice as much* means × 2)

iPad resources

Maths app >> Pre-Algebra >> Chapter 2 – Integers, Lessons 8 and 9
>> Chapter 3 – Fractions, Lesson 13
>> Chapter 4 – Decimals, Lessons 6, 10, 15

MathPro!!! >> Algebra 1, Part 1, Objective 8: Translation Between Words and Symbols >> Chapters 1 – 9 provide useful practice for determining which operation to use

Print resources

1. Steck-Vaughn GED Skill Book, Lesson 5
2. Steck-Vaughn Access Mathematics: Refer to *Problem Solving* pages in the appropriate units of study
3. Steck-Vaughn GED Mathematics (the red book), Lessons 2, 3, 4
4. Steck-Vaughn Mathematical Reasoning, Lessons 1 – 7
5. Common Core Basics Mathematics, Chapters 1 – 4: Refer to *Skills Practice* at the end of each lesson
6. Kaplan Big Book: Refer to practice questions at the end of the first two units, *Number Sense and Problem Solving* and *Decimals and Fractions*
7. TABE Fundamentals, Level D – Math Computation and also Applied Mathematics
8. Building Skills with TABE, Level D

Online resources

https://www.khanacademy.org/commoncore/grade-7-NS#7.NS.A.3

https://learnzillion.com/lessonsets/193-solve-real-world-problems-involving-the-four-operations-with-rational-numbers-1

www.quizlet.com (Enter search for Fraction word problems)

www.ixl.com/math/grade-7 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/7/NS/A/3

http://www.mathworksheetsland.com/7/15realma.html

The Number System

Know that there are numbers that are not rational, and approximate them by rational numbers.

Standard 8.NS.2 **Use rational approximations of irrational numbers to compare the size of irrational numbers, located 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 $\sqrt{2}$ is between 1 and 2, and then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

Background knowledge needed

Understanding of the definitions of rational and irrational numbers: A **rational number** can be represented as the quotient ("ratio") of two integers, such as ¼. In decimal form, a rational number either terminates (as in 4.78) or repeats a pattern after the decimal (example: 2/3 as a decimal is 0.666666666…..).

An **irrational number** cannot be expressed as the quotient ("ratio") of two integers, and as a decimal number, there is no pattern of repetition – and it never ends. Irrational numbers are usually approximated (example: π is always rounded to 3.14, but there is no pattern of repetition to it. If you Google π, you'll find there are millions of digits: 3.14159265358979323846264338327……. shows there are no patterns and it never ends). The most commonly used irrational numbers are π (Geometry), and √2 and √3 (Geometry and Trigonometry).

iPad resources

Maths apps >> Pre-Algebra >> Chapter 4 – Decimals >> Lessons 19 and 20

Print resources

1. Common Core Achieve Mathematics, Lesson 1.4

2. TI-30XS MultiView™ Scientific Calculator User's Guide, pp. 16 – 17

Online resources

https://www.khanacademy.org/commoncore/grade-8-NS#8.NS.A.2

https://learnzillion.com/lessonsets/41-understand-rational-and-irrational-numbers

https://quizlet.com/17028960/rationalirrational-numbers-flash-cards/

www.ixl.com/math/grade-7 (Click on Rational Numbers)

https://www.illustrativemathematics.org/content-standards/8/NS/A/2

http://www.mathworksheetsland.com/8/2approxirr.html

The Number System

Understand ratio concepts and use ratio reasoning to solve problems.

Standard 6.RP.3 **Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.**

6.RP.3a **Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.**

Background knowledge needed

Understanding the concept of equivalent fractions
Demonstrating multiplication skills
Plotting points on a coordinate plane

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6 >> Ratio, Proportion, & Percent >> Lessons 1 - 7

MathPro!!! >> Grade 6 Math, Objective 2: Ratios and Rates >> Chapters 1 - 3

Print resources

1. Steck-Vaughn GED Skill Book, Lesson 3

2. Steck-Vaughn Access Mathematics, Unit 4, Lesson 11

3. Common Core Basics, Unit 3, Lessons 7.1 – 7.3

4. Steck-Vaughn Mathematical Reasoning, Unit 1, Lesson 5 – 7

5. Steck-Vaughn GED Mathematics (the red book), Unit 1, Lesson 6 and 11

6. Building Skills with TABE, Level D

7.Common Core Achieve, Lessons 2.1 and 2.2

8. Kaplan Big Book, Ratio, Proportion, and Percent, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3

https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3a

https://learnzillion.com/lessonsets/164-solve-ratio-problems-using-tables-and-the-coordinate-plane-1

https://learnzillion.com/lessonsets/156-solve-ratio-problems-using-tables-and-the-coordinate-plane-2

https://quizlet.com/79834849/6rp3-ratio-and-rate-reasoning-flash-cards/

www.ixl.com/math/grade-6 (Click on Ratios, Proportions, and Percents)

https://www.illustrativemathematics.org/content-standards/6/RP/A/3

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Understand ratio concepts and use ratio reasoning to solve problems.

Standard 6.RP.3 **Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.**

6.RP.3b **Solve unit rate problems including those involving unit pricing and constant speed.** *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*

Background knowledge needed

Understanding of the concept of a ratio
Demonstrating multiplication and division skills

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6 >> Ratio, Proportion, & Percent >> Lessons 1 - 7

MathPro!!! >> Grade 6 Math, Objective 2: Ratios and Rates >> Chapters 1 – 3; also, Grade 7 Math, Objective 6: Ratio and Proportion Problems >> Chapters 1 - 3

Print resources

1. Steck-Vaughn GED Skill Book, Lesson 3

2. Steck-Vaughn Access Mathematics, Unit 4, Lesson 11

3. Common Core Basics, Unit 3, Lessons 7.1 – 7.3

4. Steck-Vaughn Mathematical Reasoning, Unit 1, Lesson 5 – 7

5. Steck-Vaughn GED Mathematics (the red book), Unit 1, Lesson 6 and 11

6. Building Skills with TABE, Level D

7.Common Core Achieve, Lessons 2.1 and 2.2

8. Kaplan Big Book, Ratio, Proportion, and Percent, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3b

https://learnzillion.com/lessonsets/157-solve-unit-rate-problems

www.ixl.com/math/grade-6 (Click on Ratios, Proportions, and Percents)

https://www.illustrativemathematics.org/content-standards/6/RP/A/3

http://www.mathworksheetsland.com/6/3realworld.html

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Understand ratio concepts and use ratio reasoning to solve problems.

Standard 6.RP.3 **Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.**

6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Background knowledge needed

Understanding of the concepts or ratio and proportion
Demonstrating multiplication and division skills

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6 >> Ratio, Proportion, & Percent >> Lessons 8 - 17

Print resources

1. Steck-Vaughn GED Skill Book, Lesson 4

2. Steck-Vaughn Access Mathematics, Unit 4, Lessons 12 and 13

3. Common Core Basics, Unit 3, Lessons 7.4 – 7.6

4. Steck-Vaughn Mathematical Reasoning, Unit 1, Lesson 7

5. Steck-Vaughn GED Mathematics (the red book), Unit 1, Lesson 11 - 13

6. Building Skills with TABE, Level D

7. TABE Fundamentals, Level D

8.Common Core Achieve, Lessons 2.1 and 2.2

9. Kaplan Big Book, Ratio, Proportion, and Percent, Lessons 1 – 6

Online resources

https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3
https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3c
https://learnzillion.com/lessonsets/181-use-ratios-to-solve-percent-problems
https://quizlet.com/79056179/6rp3-ratio-tools-and-proportional-relationships-flash-cards/
www.ixl.com/math/grade-6 (Click on Ratios, Proportions, and Percents)
https://www.illustrativemathematics.org/content-standards/6/RP/A/3

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Understand ratio concepts and use ratio reasoning to solve problems.

Standard 6.RP.3 **Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.**

6.RP.3d **Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.**

Background knowledge needed

Memorization of conversion factors (60 sec = 1 min, 12 in = 1 ft, 16 oz = 1 lb, 2 pt = 1 qt, etc.)
Demonstration of multiplication and division skills

iPad resources

Maths apps >> Pre-Algebra >> Chapter 8: Measurement >> Customary Unit Conversions (see also Metric Unit Conversions) >> Conversion Factors

Maths apps >> Pre-Algebra >> Chapter 3: Fractions >> Equivalent Fractions – Part 1

MathPro!!! >> Grade 6 math, Objective 9: Converting Measurements >> Chapters 1 - 4

Print resources

1. Steck-Vaughn GED Skills Practice: Data Analysis, Statistics, Measurement, and Geometry – Lesson 6
2. Common Core Basics, Lessons 11.1 and 11.2 (must be taught as dimensional analysis using proportions, though, as in #1 above)
3. Steck-Vaughn GED Mathematics (the red book), Lesson 14
4. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 1
5. Building Skills with TABE, Level D
6. Kaplan Big Book: Ratio, Proportion, and Percent, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-6-RP#6.RP.A.3d

https://learnzillion.com/lessonsets/164-solve-ratio-problems-using-tables-and-the-coordinate-plane-1

https://learnzillion.com/lessonsets/87-use-ratios-to-convert-unit-measures

https://quizlet.com/39956922/ratios-6rp3d-flash-cards/

www.ixl.com/math/grade-6 (Click on Measurement)

https://www.illustrativemathematics.org/content-standards/6/RP/A/3

http://www.commoncoresheets.com/SortedByGrade.php?Sorted=6rp3d

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 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 ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ / ¼ miles per hours, equivalently 2 miles per hour.*

Background knowledge needed

Understanding of the concepts of unit rates
Understanding the division of complex fractions (one fraction as the numerator and one fraction as the denominator)

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6: Ratio, Proportion, & Percent >> Unit Rate and also Unit Price lessons

MathPro!!! >> Grade 7, Objective 6: Ratio and Proportion Problems >> Chapters 1 - 4

Print resources

1. Steck-Vaughn Access Mathematics, Lesson 11
2. Common Core Basics, Lessons 7.1 and 7.2
3. Steck-Vaughn GED Mathematics (the red book), Lessons 6 and 10
4. Steck-Vaughn Mathematical Reasoning, Lesson 5
5. Building Skills with TABE, Level D
6. Common Core Achieve, Lesson 2.1

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.1

https://learnzillion.com/lessonsets/521-compute-unit-rates-associated-with-ratios-of-fractions

https://learnzillion.com/lessonsets/459-compute-unit-rates-using-fractions

https://learnzillion.com/lessonsets/107-compute-unit-rates-associated-with-ratios-of-fractions

https://quizlet.com/42921799/standard-7rp1-flash-cards/

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/1

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 7.RP.2 **Recognize and represent proportional relationships between quantities.**

7.RP.2a **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.**

Background knowledge needed

Recognizing equivalent fractions
Graphing points on a coordinate plane
Reading simple tables

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6: Ratio, Proportion, & Percent >> Intro to Ratios (also, Equivalent Ratios, and Intro to Proportions)

Print resources

1. Common Core Basics, Lessons 7.2 and 7.3

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.2

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.2a

https://learnzillion.com/lessonsets/366-determining-whether-two-quantities-are-in-a-proportional-relationship

https://learnzillion.com/lessonsets/117-decide-whether-two-quantities-are-in-a-proportional-relationship-1

https://learnzillion.com/lessonsets/54-determine-whether-ratios-are-equivalent

https://quizlet.com/19633829/math-target-7rp2-flash-cards/

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/2

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 7.RP.2 **Recognize and represent proportional relationships between quantities.**

7.RP.2b [*Also see 8.EE.5*] **Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.**

Background knowledge needed

Recognizing equivalent fractions
Graphing points on a coordinate plane
Reading simple tables

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6: Ratio, Proportion, & Percent >> Unit Rate (also, Unit Price)

MathPro!!! >> Grade 6 Math, Objective 2: Ratios and Rates >> Chapter 1

Print resources

1. Common Core Basics, Lessons 7.1 – 7.3

2. Steck-Vaughn Mathematical Reasoning, Unit 4, Lesson 6

3. Common Core Achieve, Lesson 6.4

4. Kaplan Big Book: Ratio, Proportion, and Percent, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.2b

https://learnzillion.com/lessonsets/367-identifying-the-constant-of-proportionality-unit-rate

https://learnzillion.com/lessonsets/136-identify-the-constant-of-proportionality-unit-rate-1

https://quizlet.com/19633829/math-target-7rp2-flash-cards/

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/2

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 7.RP.2 **Recognize and represent proportional relationships between quantities.**

7.RP.2c **Represent proportional relationships by equations.** *For example, if total cost* ***t*** *is proportional to the number of items* ***n*** *purchased at a constant price* ***p****, the relationship between the total cost and the number of items can be expressed as* ***t = pn****.*

Background knowledge needed

Solving simple equations by multiplication
Using variables to represent unknown quantities

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6: Ratio, Proportion, & Percent >> Proportion Word Problems

MathPro!!! >> Grade 7 Math, Objective 6: Ratio and Proportion Problems >> Chapters 1 - 4

Print resources

1. Common Core Basics, Lessons 7.1 – 7.3

2. Steck-Vaughn Mathematical Reasoning, Unit 4, Lesson 6

3. Common Core Achieve, Lesson 6.4

4. Kaplan Big Book: Ratio, Proportion, and Percent, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.2c

https://learnzillion.com/lessonsets/325-represent-proportional-relationships-by-equations

www.quizlet.com (Enter search for Identifying proportions)

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/2

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 7.RP.2 **Recognize and represent proportional relationships between quantities.**

7.RP.2d **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.**

Background knowledge needed

Graphing points on the coordinate plane

iPad resources

NONE

Print resources

1. Common Core Basics, Lesson 7.2

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.2d

https://learnzillion.com/lessonsets/612-explain-what-point-x-y-on-the-graph-of-a-proportional-relationship-means

https://learnzillion.com/lessonsets/590-recognize-and-represent-proportional-relationships-interpret-a-point-on-the-graph-of-a-proportional-relationship

https://quizlet.com/39672414/ratios-7rp2d-flash-cards/

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/2

The Number System

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Standard 7.RP.3 [*Also see 7.G.1 and G.MG.2*] **Use proportional relationships to solve multistep ratio and percent problems.** *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

Background knowledge needed

Solving proportions for one unknown by using cross-multiplication
Using the interest formula, *I = prt*, and understanding the concepts of interest, principal, rate, and time

iPad resources

Maths apps >> Pre-Algebra >> Chapter 6: Ratio, Proportion, & Percent >> Proportion Word Problems; also, Percent Word Problems, parts 1 – 3; Percent Increase and Decrease; Discount; Sales Tax; and Interest

MathPro!!! >> Pre-Algebra, Objective 7: Money Word Problems (Percent, Tips, Discount, Simple Interest) >> Chapters 3, 5, 6, and 8

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics Number Operations and Algebra, Lessons 4 and 5

2. Steck-Vaughn Access Mathematics, pp. 192 – 193, pp. 204 – 205

3. Common Core Basics Mathematics, Lessons 7.5 and 7.6

4. Common Core Achieve Mathematics, Lesson 2.2

5. Steck-Vaughn Mathematical Reasoning, Lesson 7

6. Steck-Vaughn GED Mathematics (the red book), pp. 136 – 137, pp. 140 – 141, pp. 146 – 149

7. Kaplan Big Book: Ratio, Proportion, and Percent, Lessons 5 – 6

Online resources

https://www.khanacademy.org/commoncore/grade-7-RP#7.RP.A.3

https://learnzillion.com/lessonsets/658-use-proportional-relationships-to-solve-multi-step-ratio-and-percent-problems

https://learnzillion.com/lessonsets/608-use-proportional-relationships-to-solve-ratio-and-percent-problems

https://learnzillion.com/lessonsets/224-use-proportional-relationships-to-solve-multistep-ratio-and-percent-problems

https://learnzillion.com/lessonsets/55-solve-proportional-problems
www.quizlet.com (Enter search for Proportion word problems)

www.ixl.com/math/grade-7 (Click on Ratios, proportions, and percents)

https://www.illustrativemathematics.org/content-standards/7/RP/A/3

Career Ready 101, Applied Math Level 4 – Proportions and Ratios

The Number System

Use properties of operations to generate equivalent expressions.

Standard 7.EE.1 **Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.**

Background knowledge needed

Understanding how to use the four arithmetic operations
Understanding the concepts of "like" terms

iPad resources

Maths apps >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Evaluating Expressions; Combining Like Terms; and Distributive Property

MathPro!!! >> Pre-Algebra, Objective 9: Substitution with Values >> Chapter 1

Print resources

1. Common Core Basics Mathematics, Lesson5.1

2. Common Core Achieve Mathematics, Lesson 3.1

3. Steck-Vaughn Mathematical Reasoning: Unit 3, Lesson 1

4. Steck-Vaughn GED Mathematics (the red book), Lesson 18, pp. 214 -217

5. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lessons 6 – 10

Online resources

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.A.1

https://learnzillion.com/lessonsets/141-apply-properties-of-operations-to-linear-expressions-with-rational-coefficients-1

https://learnzillion.com/lessonsets/126-apply-properties-of-operations-to-linear-expressions-with-rational-coefficients-2

www.quizlet.com (Enter search for Linear expressions)

www.ixl.com/math/grade-7 (Click on Variable expressions)

https://www.illustrativemathematics.org/content-standards/7/EE/A/1

The Number System

Use properties of operations to generate equivalent expressions.

Standard 7.EE.2 [*Also see A.SSE.2, A.SSE.3, A.SSE.3a, A.CED.4.*] **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."*

Background knowledge needed

Understanding how to use the four arithmetic operations
Understanding the concepts of "like" terms
Understanding the concept of equality in mathematics

iPad resources

Maths apps >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Modeling Expressions

Print resources

1. Common Core Basics, Lesson 5.5

2. Common Core Achieve, Lesson 3.4

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.A.2

https://learnzillion.com/lessonsets/568-understand-that-rewriting-an-expression-in-different-forms-can-help-solve-the-problem

https://learnzillion.com/lessonsets/204-rewrite-an-expression-to-understand-how-the-quantities-are-related

www.quizlet.com (Enter search for Grade 7 math equivalent expressions)

www.ixl.com/math/grade-7 (Click on Variable expressions)

https://www.illustrativemathematics.org/content-standards/7/EE/A/2

The Number System

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Standard 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 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 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.*

Background knowledge needed

Rounding skills for estimation/estimation strategies
Determining whether an answer is reasonable
Making mental calculations

iPad resources

Maths apps >> Pre-Algebra >> Chapter 1: Whole Numbers >> Estimating Sums and Differences/Addition and Subtraction Word Problems/Estimating Products and Quotients/Multiplication and Division Word Problems; also, Chapter 3: Fractions >> Fraction Word Problems; also, Chapter 4: Decimals >> Decimal Word Problems/Decimal Word Problems – Add and Subtract/Decimal Word Problems – Multiply and Divide

MathPro!!! >> Pre-Algebra, Objective 7: Money Word Problems (all chapters); also, Objective 8: Ratio and Proportion Problems (all chapters); also, Objective 30: Word Problems (all chapters)

Print resources

1. Steck-Vaughn GED Skill Book: Mathematics Number Operations and Algebra, Lesson 5
2. Steck-Vaughn Access Mathematics, pp. 44 -45
3. Building Skills with TABE, Mathematics Level D, Workout: Estimation
4. Common Core Basics Mathematics, Lesson 1.7
5. Steck-Vaughn Mathematical Reasoning, all the word problems in Unit 1
6. Steck-Vaughn GED Mathematics (the red book), pp. 46 – 47, 74 – 75, 96 -97, 108 – 109, 116 – 177, 136 – 151,238 – 239
7. Kaplan Big Book, Number Sense and Problem Solving, Lesson 4

Online resources

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.3

https://learnzillion.com/lessonsets/680-solve-complex-problems-with-positive-and-negative-rational-numbers-in-all-forms-converting-between-forms-and-assessing-the-reasonableness-of-answers

https://learnzillion.com/lessonsets/135-solve-multi-step-real-life-and-mathematical-problems-with-positive-and-negative-rational-numbers-in-any-form

www.quizlet.com (Enter search for Grade 7 math problem solving skills)

www.ixl.com/math/grade-7 (Click on Problem solving and estimation)

https://www.illustrativemathematics.org/content-standards/7/EE/B/3

The Number System

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Standard 7.EE.4 [*Also see A.CED.1 and A.REI.3*] **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.**

7.EE.4a [*Also see A.CED.1 and A.REI.3*] **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?*

Background knowledge needed

Translating from words to algebraic expressions, using a variable for an unknown value
Solving one-step and two-step equations
Using the distributive property to multiply terms

iPad resources

Maths apps >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Intro to Equations; Writing One-Step Equations; Writing Two-Step Equations

Maths apps >> Algebra 1 >> Chapter 3: Word Problems >> Algebra Problems; Percent Problems; Interest Problems

MathPro!!! >> Algebra 1, Part 1, Objective 4: Simple Linear Equations (all chapters); also, Objective 6: Solving Equations and Inequalities, Chapter 7

Print resources

1. Steck-Vaughn GED Skill Book, Mathematics: Number Operations and Algebra, Lesson 10
2. Steck-Vaughn GED Mathematics (the red book), Lesson 19
3. Steck-Vaughn Access Mathematics, 42 – 45
4. Common Core Basics, Lessons 5.2 and 5.3
5. Common Core Achieve, Lessons 3.2 and 3.4 (equations, not inequalities)
6. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 2
7. Kaplan Big Book, Equations, Inequalities, and Functions: Lessons 1 and 2
8. McDougal Littell Algebra 1, Lessons 3.1 – 3.3

Online resources

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4a

https://learnzillion.com/lessonsets/323-solving-word-problems-with-equations-and-inequalities

https://quizlet.com/46573461/7ee4-one-step-equations-flash-cards/

www.ixl.com/math/grade-7 (Click on Single-variable equations)

https://www.illustrativemathematics.org/content-standards/7/EE/B/4

The Number System

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Standard 7.EE.4 [*Also see A.CED.1 and A.REI.3*] **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.**

7.EE.4b [*Also see A.CED.1 and A.REI.3*] **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 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.*

Background knowledge needed

Translating from words to algebraic expressions, using a variable for an unknown value
Solving one-step and two-step inequalities

iPad resources

Maths app >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Intro to Inequalities; also Solving Inequalities

Maths apps >> Algebra 1 >> Chapter 12: Additional NCTM Concepts >> Translating English to Algebra; also Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Solving Inequalities

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 248 – 249

2. Common Core Basics, Lesson 5.4

3. Common Core Achieve, Lessons 3.3 and 3.4

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 10

5. McDougal Littell Algebra 1, Lessons 6.1 – 6.2 (addition and subtraction only)

6. Kaplan Big Book -- Equations, Inequalities, and Functions, Lesson 3

Online resources

https://www.khanacademy.org/commoncore/grade-7-EE#7.EE.B.4b

https://learnzillion.com/lessonsets/323-solving-word-problems-with-equations-and-inequalities

https://quizlet.com/39675643/expressionsequations-7ee4b-flash-cards/

www.ixl.com/math/grade-7 (Click on Inequalities)

https://www.illustrativemathematics.org/content-standards/7/EE/B/4

The Number System

Work with radicals and integer exponents.

Standard 8.EE.1 **Know and apply the properties of integer exponents to generate equivalent numerical expressions.** *For example,* $3^2 \times 3^{(-5)} = 3^{(-3)} = (1/3)^3 = 1/27$. [*Also see F.IF.8b.*]

Background knowledge needed

Addition of integers
Rules of exponents (when multiplying "like" bases, add the exponents)
Understanding that a negative exponent means the same as taking the reciprocal of the base

iPad resources

Maths apps >> Algebra 1 >> Chapter 7: Exponents and Polynomials >> Product Rule; also Quotient Rule; also Numerical Bases & Exponents of Zero; also Exponent Rules

MathPro!!! >> Grade 8 Math >> Objective 19: Exponents (all chapters)

Print resources

1. Steck-Vaughn GED Mathematics (the red book), Lesson 20

2. Common Core Achieve, Lesson 1.3, Lesson 1.4 (pp 40 – 41, Rational Exponents)

3. McDougal Littell Algebra 1, Lessons 8.1 – 8.2 (skip the section on graphing an exponential function), Lesson 8.3

4. Kaplan Big Book, Algebra Basics, Expressions, and Polynomials, Lesson 2

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.A.1

https://learnzillion.com/lessonsets/307-know-and-apply-the-properties-of-integer-exponents-to-generate-equivalent-numerical-expressions

https://learnzillion.com/lessonsets/43-understand-negative-exponents-bases-and-scientific-notation

https://learnzillion.com/lessonsets/42-evaluate-expressions-with-exponents

www.quizlet.com (Enter search for Grade 8 Exponent Properties)

www.ixl.com/math/grade-8 (Click on Exponents and Roots)

https://www.illustrativemathematics.org/content-standards/8/EE/A/1

The Number System

Work with radicals and integer exponents.

Standard 8.EE.2 **Use square root 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.**

Background knowledge needed

Memorization of the results of 1^2 through 10^2 and 1^3 through 10^3

iPad resources

MathPro!!! >> Algebra 2, Part 1, Objective 3: Radical Expressions

Print resources

1. Steck-Vaughn GED Mathematics Skill Book, Lesson 7
2. Steck-Vaughn Mathematics (the red book), Unit 3, Lesson 20 (pp. 236 – 237)
3. Steck-Vaughn Access Mathematics, page 245
4. Common Core Basics, Lesson 8.2
5. Common Core Achieve, Lesson 1.4
6. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 3
7. McDougal Littell Algebra 1, Lesson 9.1
8. Kaplan Big Book, Algebra Basics, Expressions, and Polynomials: Lesson 2

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.A.2

https://learnzillion.com/lessonsets/351-understand-and-evaluate-square-roots-and-cube-roots

https://learnzillion.com/lessonsets/45-understand-perfect-cubes-and-cube-roots

https://learnzillion.com/lessonsets/44-understand-perfect-squares-and-square-roots

https://quizlet.com/51406382/8ee2-cubes-of-1-10-flash-cards/

www.ixl.com/math/grade-8 (Click on Exponents and Roots, F.13 and F.18)

https://www.illustrativemathematics.org/content-standards/8/EE/A/2

The Number System

Work with radicals and integer exponents.

Standard 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.*

Background knowledge needed

Understanding of the concept of scientific notation and operations with scientific notation

iPad resources

Maths app >> Pre-Algebra >> Chapter 4: Decimals >> Powers of 10; also, Scientific Notation; also, Converting to Scientific Notation

MathPro!!! >> Algebra 1, Part 2, Objective 11: Exponents >> Chapters 7 and 8; also, Algebra 1, Part 1, Objective 21: Scientific Notation, all chapters

Print resources

1. Steck-Vaughn Mathematics GED Skill Book, pages 23 – 25

2. Steck-Vaughn GED Mathematics (the red book), Lesson 20

3. Common Core Basics Mathematics, Lesson 8.3

4. Common Core Achieve Mathematics, Lesson 1.3

5. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 4

6. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials – Lesson 3

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.A.3

https://learnzillion.com/lessonsets/272-estimate-and-compare-with-integers-to-the-power-of-10

www.quizlet.com (Enter search for Grade 8 Orders of Magnitude)

www.ixl.com/math/grade-8 (Click on Scientific Notation)

https://www.illustrativemathematics.org/content-standards/8/EE/A/3

The Number System

Work with radicals and integer exponents.

Standard 8.EE.4 [*Also see N.Q.3*] **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.**

Background knowledge needed

Understanding of the concept of scientific notation
Understanding that negative exponents for powers of 10 represent small decimal numbers
Understanding how to use the four arithmetic operations

iPad resources

MathPro!!! >> Algebra 1, Part 2, Objective 11: Exponents >> Chapters 7 and 8

Print resources

1. Common Core Achieve Mathematics, Lesson 1.3 (specifically, pages 32 – 33)

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.A.4

https://learnzillion.com/lessonsets/276-perform-operations-with-numbers-expressed-in-scientific-notation-including-decimals

www.quizlet.com (Enter search for Grade 8 Scientific Notation and Scientific Notation Operations)

www.ixl.com/math/grade-8 (Click on Scientific Notation)

https://www.illustrativemathematics.org/content-standards/8/EE/A/4

The Number System

Understand the connections between proportional relationships, lines, and linear equations.

Standard 8.EE.5 [*Also see 7.RP.2b*] **Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.** *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*

Background knowledge needed

Graphing a linear equation of the form $y = mx$, where m represents the slope of the line
Understanding the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$ *(also may be written as* $\frac{\Delta y}{\Delta x}$ *, as seen in www.khanacademy.org videos)*

Understanding the concept of a unit rate
Understanding proportional relationships

iPad resources

Maths app >> Pre-Algebra >> Chapter 6: Ratio, Proportion, and Percent >> Unit Rate

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >> Slope as a Rate of Change

Print resources

1. Common Core Basics Mathematics, Lesson 7.2

2. Common Core Achieve Mathematics, Lessons 5.1 and 6.4

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.B.5

https://learnzillion.com/lessonsets/275-graph-interpret-and-compare-proportional-relationships

https://quizlet.com/58816953/8ee5-8ee6-flash-cards/

www.ixl.com/math/grade-8 (Click on Proportional Relationships)

https://www.illustrativemathematics.org/content-standards/8/EE/B/5

The Number System

Analyze and solve linear equations and pairs of simultaneous linear equations.

Standard 8.EE.7 [*Also see A.REI.3*] **Solve linear equations in one variable.**

8.EE.7a **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).**

Background information needed

Using opposite operations to cancel numbers
Understanding the concept of an arithmetical identity, such as 5 = 5

iPad resources

Maths app >> Algebra 1 >> Chapter 2: Equations >> One-Step Equations

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Variables, Expressions, & Equations >> Equations

Print resources

1. McDougal-Littell Algebra 1, Lesson 3.4

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.7

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.7a

https://learnzillion.com/lessonsets/419-give-examples-of-linear-equations-in-one-variable

https://learnzillion.com/lessonsets/124-find-examples-of-linear-equations-in-one-variable-with-one-none-or-many-solutions

https://learnzillion.com/lessonsets/49-solve-linear-equations-using-various-methods

www.quizlet.com (Enter search for Grade 8 Number of Solutions for Systems of Linear Equations)

www.ixl.com/math/grade-8 (Click on Single-variable equations, Identities and equations with no solutions)

https://www.illustrativemathematics.org/content-standards/8/EE/C/7

The Number System

Analyze and solve linear equations and pairs of simultaneous linear equations.

Standard 8.EE.7 [*Also see A.REI.3*] **Solve linear equations in one variable.**

8.EE.7b **Solve linear equations with rational number coefficients, including equations whose solutions required expanding expressions using the distributive property and collecting like terms.**

Background knowledge needed

Understanding the concept of "like" terms
Using the distributive property to multiply a constant by a binomial
Using the four arithmetic operations and their inverses to solve equations in one variable
Using the order of operations

iPad resources

Maths app >> Algebra 1 >> Chapter 1: Simplifying >> Combining like terms; also, Distributive property; also, Chapter 2: Equations >> One-step equations; also, Two-step equations; also, Multi-step equations

MathPro!!! >> Grade 8 Math, Objective 15: 2-Step Equations and Inequalities >> Chapters 2 - 4

Print resources

1. McDougal-Littell Algebra 1, Lessons 3.1 – 3.3

2. Common Core Basics Mathematics, Lessons 5.2 – 5.3

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 2

4. Common Core Achieve, Lesson 3.2

5. Kaplan Big Book, Equations, Inequalities, and Functions, Lesson 1

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.7b

https://learnzillion.com/lessonsets/560-solve-linear-equations-in-one-variable

https://learnzillion.com/lessonsets/128-solve-linear-equations-with-rational-coefficients

https://learnzillion.com/lessonsets/49-solve-linear-equations-using-various-methods

www.quizlet.com (Enter search for Grade 8 Solving equations in one variable)

www.ixl.com/math/grade-8 (Click on Single-variable equations)

https://www.illustrativemathematics.org/content-standards/8/EE/C/7

The Number System

Analyze and solve linear equations and pairs of simultaneous linear equations.

***Standard 8.EE.8*. Analyze and solve pairs of simultaneous linear equations.**

8.EE.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

Background knowledge needed

Understanding that an ordered pair (*x*, *y*) is a solution to a linear equation if it results in a true statement when the *x*- and *y*-coordinates of the ordered pair are substituted into the given equation. *For example, the ordered pair* (1, 4) *is a solution to the linear equation y = 3x +1 because substituting 1 for x and 4 for y in the equation results in the true statement 4 = 4.*

Understanding how to graph a linear equation in the form *y = mx + b* by graphing the *y*-intercept ("*b*") and using the slope ("*m*") to locate more points on the line.

iPad resources

Maths app >> Algebra 1 >> Chapter 6: Systems of Equations >> Systems of Equations – by Graphing

MathPro!!! >> Algebra 1, Part 2, Objective 10: Graphing Systems of Equalities/Inequalities >> Chapters 3 - 4

Print resources

1. McDougal-Littell Algebra 1, Lesson 7.1
2. Common Core Basics Mathematics, Lesson 6.3
3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 7
4. Common Core Achieve Mathematics, Lesson 5.4
5. Kaplan Big Book, Equations, Inequalities, and Functions: Lesson 10

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.8

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.8a

https://learnzillion.com/lessonsets/776-solve-pairs-of-simultaneous-linear-equations-understand-why-solutions-correspond-to-points-of-intersection

https://learnzillion.com/lessonsets/50-graphing-to-solve-systems-of-equations

www.quizlet.com (Enter search for Grade 8 Solution to a system of equations)

www.ixl.com/math/grade-8 (Click on Systems of linear equations)

https://www.illustrativemathematics.org/content-standards/8/EE/C/8

The Number System

Analyze and solve linear equations and pairs of simultaneous linear equations.

***Standard 8.EE.8*. Analyze and solve pairs of simultaneous linear equations.**

8.EE.8b [*Also see A.REI.6*] **Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.** *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.*

Background knowledge needed

Understanding that an ordered pair (*x*, *y*) is a solution to a linear equation if it results in a true statement when the *x*- and *y*-coordinates of the ordered pair are substituted into the given equation. *For example, the ordered pair* (1, 4) *is a solution to the linear equation y = 3x +1 because substituting 1 for x and 4 for y in the equation results in the true statement 4 = 4.*

Understanding how to graph a linear equation in the form *y = mx + b* by graphing the *y*-intercept ("*b*") and using the slope ("*m*") to locate more points on the line.

Using the four arithmetic operations to simplify equations

Being able to arrange equations in the form of *ax + by = c*

iPad resources

Maths app >> Algebra 1 >> Chapter 6: Systems of Equations >> Systems of Equations – by Addition; also, Systems of Equations – by Substitution

MathPro!!! >> Algebra 1, Part 2, Objective 10: Graphing Systems of Equalities/Inequalities >> Chapters 3 - 8

Print resources

1. McDougal-Littell Algebra 1, Lessons 7.2 – 7.3
2. Common Core Basics Mathematics, Lesson 6.3
3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 7
4. Common Core Achieve Mathematics, Lesson 5.4
5. Kaplan Big Book, Equations, Inequalities, and Functions: Lesson 10

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.8b

https://learnzillion.com/lessonsets/777-analyze-and-solve-pairs-of-simultaneous-linear-equations-solve-systems-in-two-equations-algebraically

https://learnzillion.com/lessonsets/129-solve-systems-of-two-linear-equations-in-two-variables-algebraically-and-estimate-solutions-by-graphing

https://learnzillion.com/lessonsets/51-solve-systems-of-equations-using-substitution-and-elimination

https://learnzillion.com/lessonsets/50-graphing-to-solve-systems-of-equations

https://quizlet.com/45633953/expressions-and-equations-m8ee8b-flash-cards/

www.ixl.com/math/grade-8 (Click on Systems of linear equations)

https://www.illustrativemathematics.org/content-standards/8/EE/C/8

The Number System

Analyze and solve linear equations and pairs of simultaneous linear equations.

Standard 8.EE.8. **Analyze and solve pairs of simultaneous linear equations.**

8.EE.8c Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

Background knowledge needed

Understanding that an ordered pair (*x*, *y*) is a solution to a linear equation if it results in a true statement when the *x*- and *y*-coordinates of the ordered pair are substituted into the given equation. *For example, the ordered pair* (1, 4) *is a solution to the linear equation y = 3x +1 because substituting 1 for x and 4 for y in the equation results in the true statement 4 = 4.*

Translating from words to symbols to create equations

iPad resources

Maths app >> Algebra 1 >> Chapter 6: Systems of Equations >> Number and Value Problems; also, Wind and Current Problems

MathPro!!! >> Algebra 1, Part 2, Objective 10: Graphing Systems of Equalities/Inequalities >> Chapter 8

Print resources

1. McDougal-Littell Algebra 1, Lessons 7.4

2. Common Core Basics Mathematics, Lesson 6.3

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 7

4. Common Core Achieve Mathematics, Lesson 5.4

5. Kaplan Big Book, Equations, Inequalities, and Functions: Lesson 10

Online resources

https://www.khanacademy.org/commoncore/grade-8-EE#8.EE.C.8c

https://learnzillion.com (Enter search for standard 8.EE.8c; no lessons available as of 5/5/15)

www.quizlet.com (Enter search for Grade 8 Modeling systems of equations)

www.ixl.com/math/grade-8 (Click on Systems of linear equations – word problems)

https://www.illustrativemathematics.org/content-standards/8/EE/C/8

Functions

Define, evaluate, and compare functions

Standard 8.F.1 [*Also see F.IF.1*] **Understand that a function is a rule that assigns to each input exactly one output. That the graph of a function is the set of ordered pairs consisting of an input and the corresponding output.**

Background knowledge needed

Understanding that, using an ordered pair (*x, y*) in a linear equation, the *x*-coordinate is the input value and the *y*-coordinate is the corresponding output value that results when substituting values into the equation to make it true.

Definition of a relation: A relation is a group of ordered pairs (*x, y*).

Definition of a function: A function is a relation in which each value of x can be paired with only one value of *y*. *For example, the relation of {(1, 2), (2, 4), (3, 6)} is a function because each x-coordinate (1, 2, and 3) is paired with only one y-coordinate (2, 4, and 6). The relation of {(1, 2), (2, 4), (1, 3)} is NOT a function because the x-value of 1 is paired with two different y-values (2 and 3).*

iPad resources

Maths app >> Algebra 1 >> Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Relations and Functions; also, Function Notation

MathPro!!! >> Algebra 1, Part 2, Objective 6: Functions >> Chapters 1 - 5

Print resources

1. McDougal-Littell Algebra 1, Lesson 4.8

2. Steck-Vaughn GED Mathematics (the red book), pp. 240 – 241

3. Common Core Basics Mathematics, Lesson 6.5

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 5

5. Common Core Achieve, Lesson 6.1

6. Kaplan Big Book, Equations, Inequalities, and Functions: Lesson 11

Online resources

https://www.khanacademy.org/commoncore/grade-8-F#8.F.A.1

https://learnzillion.com/lessonsets/420-understand-functions-and-their-graphs

https://learnzillion.com/lessonsets/271-understand-and-compare-functions

www.quizlet.com (Enter search for Grade 8 Linear Functions)

www.ixl.com/math/grade-8 (Click on Linear functions)

https://www.illustrativemathematics.org/content-standards/8/F/A

Functions

Define, evaluate, and compare functions

Standard 8.F.3 **Interpret the equation *y = mx + b* as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.** *For example, the function A^2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4), and (3,9), which are not on a straight line.*

Background knowledge needed

Graphing from the slope-intercept equation *y = mx + b*, where *b* represents the *y*-intercept and *m* represents the slope

iPad resources

Maths app >> Algebra 1 >> Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Graphing Lines (also, Graphing Lines – Intercept Method)

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >> Using Slope to graph a line (also, Slope-Intercept Form; also, Converting to Slope-Intercept Form)

MathPro!!! >> Algebra 1, Part 2, Objective 9: Writing Linear Equations >> Chapters 5 & 8

Print resources

1. McDougal-Littell Algebra 1, Lessons 4.6 and 5.1

2. Steck-Vaughn GED Mathematics (the red book), pp. 260 – 261

3. Common Core Basics Mathematics, Lesson 6.2

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 13

5. Common Core Achieve Mathematics, Lessons 5.2 – 5.3

6. Kaplan Big Book, Equations, Inequalities, and Functions, Lesson 9

Online resources

https://www.khanacademy.org/commoncore/grade-8-F#8.F.A.3

https://learnzillion.com/lessonsets/561-interpret-the-equation-y-mx-b

https://learnzillion.com/lessonsets/277-interpret-the-equation-y-mx-b-as-defining-a-linear-function

www.quizlet.com (Enter search for Grade 8 Slope-intercept equations)

www.ixl.com/math/grade-8 (Click on Linear functions)

https://www.illustrativemathematics.org/content-standards/8/F/A/3

Functions

Use functions to model relationships between quantities

Standard 8.F.4 [*Also see F.BF.1 and F.LE.5*] **Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x*,*y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.**

Background knowledge needed

Understanding that the slope provides the rate of change
Understanding how to graph points on the coordinate plane
Understanding the relationship between a table of values (*x*,*y*) and the graph of those values on the coordinate plane

iPad resources

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >> Table Building – Word Problems; also, Slope as a Rate of Change; also, Slope of a Line; also, Using Slope to Graph a Line; also, Slope of a Line – Graphs and Tables; also, Linear Function Word Problems

MathPro!!! >> Grade 8 Math, Objective 14: Function Tables >> Chapters 1 - 7

Print resources

1. McDougal-Littell Algebra 1, Lessons 4.4 and 5.2

2. Common Core Achieve Mathematics, Lesson 5.1

3. Kaplan Big Book, Equations, Inequalities, and Functions: Lessons 11 and 12

Online resources

https://www.khanacademy.org/commoncore/grade-8-F#8.F.B.4

https://learnzillion.com/lessonsets/686-construct-functions-determine-slope-and-initial-value-and-interpret-in-terms-of-a-situation

https://learnzillion.com/lessonsets/357-construct-functions-to-model-linear-relationships-between-two-quantities

https://learnzillion.com/lessonsets/52-construct-and-compare-linear-functions

https://quizlet.com/40339868/functions-m8f4-flash-cards/

www.ixl.com/math/grade-8 (Click on Linear functions – V.8 Linear function word problems)

https://www.illustrativemathematics.org/content-standards/8/F/B/4

Functions

Use functions to model relationship between quantities

Standard 8.F.5 *[Also see A.REI.10 and F.IF.7]* **Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function Is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.**

Background knowledge needed

Understanding how to graph on the coordinate plane
Differentiating between increasing and decreasing on the graph

iPad resources

Maths app >> Additional NCTM Concepts >> Interpreting Graphs; also Linear and Quadratic Relationships

MathPro!!! >> Algebra 2, Part 1, Objective 9: Functions, Domain, Range, etc. >> Chapter 8

Print resources

1. McDougal-Littell Algebra 1, Lesson 4.1

2. Common Core Basics Mathematics, Lesson 6.2

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 5 and Lesson 16

4. Common Core Achieve Mathematics, Lesson 6.2

Online resources

https://www.khanacademy.org/commoncore/grade-8-F#8.F.B.5

https://learnzillion.com/lessonsets/705-describe-functions-by-analyzing-and-building-graphs

https://learnzillion.com/lessonsets/358-describe-the-functional-relationship-between-two-quantities-by-analyzing-a-graph

www.quizlet.com (Enter search for Grade 8 Algebraic functional relationships)

www.ixl.com/math/grade-8 (Click on Linear Functions and also on Nonlinear Functions)

https://www.illustrativemathematics.org/content-standards/8/F/B/5

Geometry

Draw, construct, and describe geometrical figures and describe the relationships between them.

Standard 7.G.1 [*Also see 7.RP.3*] **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.**

Background knowledge needed

Understanding proportional relationships and how to solve a proportion for a missing variable
Understanding the concept of similar polygons

iPad resources

Maths apps >> Pre-Algebra >> Chapter 7: Geometry >> Similar Figures and Proportions

Maths apps >> Geometry >> Chapter 6: Similarity >> Proportion; also Similar Polygons

MathPro!!! >> Grade 7 Math, Objective 6: Ratio and Proportion Problems >> Chapter 3

Print resources

1. Steck-Vaughn Mathematics, pp. 306 – 307

2. Common Core Basics, Lesson 12.3

3. Steck-Vaughn Mathematical Reasoning, Unit 4, Lesson 6

4. Common Core Achieve, Lesson 2.1

Online resources

https://www.khanacademy.org/commoncore/grade-7-G#7.G.A.1

https://learnzillion.com/lessonsets/604-apply-scale-factor-to-real-world-problems

https://learnzillion.com/lessonsets/451-solve-problems-involving-scale-drawings-of-geometric-figures

https://learnzillion.com/lessonsets/199-solve-problems-involving-scale-drawings-of-geometric-figures

www.quizlet.com (Enter search for Grade 7 Scale Factors)

www.ixl.com/math/grade-7 (Click on Geometry and scroll down to P.13 – Similar figures)

https://www.illustrativemathematics.org/content-standards/7/G/A/1

Geometry

Solve real-life and mathematical problems involving angles, measure, area, surface area, and volume.

Standard 7.G.4 **Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.**

Background knowledge needed

Understanding how to substitute for variables in a formula and perform the resulting calculations

Understanding the definitions of circumference (distance around a circle), diameter (distance across a circle, passing through the center of the circle), and radius (length of the segment between the center of the circle and the circle itself)

Understanding that π is the ratio of the circumference of the circle to its diameter, and that we use either $\pi = 3.14$ or $\pi = 22/7$ for calculations, depending on the given information

iPad resources

Maths app >> Geometry >> Chapter 9: Area >> Area & Circumference of a Circle

Maths app >> Pre-Algebra >> Chapter 7: Geometry >> Circles (may be used to introduce or review the vocabulary of circles)

MathPro!!! >> Grade 7 Math, Objective 7: Area and Perimeter >> Chapters 7 and 8

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 276 – 277
2. Common Core Basics Mathematics, Lesson 12.2 and 12.4
3. Steck-Vaughn Mathematical Reasoning, Unit 4, Lesson 4
4. Common Core Achieve Mathematics, Lesson 7.2
5. Kaplan Big Book, Geometry: Lesson 5

Online resources

https://www.khanacademy.org/commoncore/grade-7-G#7.G.B.4

https://learnzillion.com/lessonsets/231-know-and-use-the-formulas-for-area-and-circumference-of-a-circle

www.quizlet.com (Enter search for Grade 7 Area and circumference of circles)

www.ixl.com/math/grade-7 (Click on Geometry and scroll down to P.22 – Circles: calculate area, circumference, radius, and diameter

https://www.illustrativemathematics.org/content-standards/7/G/B/4

Career Ready 101, Applied Math Level 5 – Measurement; Perimeter and Area

Geometry

Solve real-life and mathematical problems involving angles, measure, area, surface area, and volume.

Standard 7.G.5 **Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.**

Background knowledge needed

Understanding the parts of an angle (vertex, sides (rays)) and how to name an angle

Understanding the definitions of **supplementary** (two angles whose measures add to 180), **complementary** (two angles whose measures add to 90), **vertical angles** (two angles that share the same vertex, but they form a "V" shape and they always have the same measure), and **adjacent angles** (two angles that share the same vertex and a common side; their measures can be added together to give the measure of the larger angle formed by the non-common sides)

iPad resources

Maths apps >> Pre-Algebra >> Chapter 7: Geometry >> Complementary and Supplementary Angles

Maths apps >> Geometry >> Chapter 2: Angle Pairs & Perpendicular Lines >> Complementary and Supplementary (Parts 1 and 2); also, Vertical Angles

MathPro!!! >> Grade 8 Math, Objective 6: Angles >> Chapters 4 - 7

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 286 – 293

2. Steck-Vaughn GED Skill Book – Mathematics: Data Analysis, Statistics, Measurement and Geometry, Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-7-G#7.G.B.5

https://learnzillion.com/lessonsets/430-solve-for-unknown-angles-using-angle-properties

https://learnzillion.com/lessonsets/232-use-facts-about-supplementary-complementary-vertical-and-adjacent-angles-to-solve-simple-equations-for-an-unknown-angle

www.quizlet.com (Enter search for Grade 7 Angles)

www.ixl.com/math/grade-7 (Click on Geometry and scroll down to P.4: Identify complementary, supplementary, vertical, adjacent, and congruent angles and also P5: Find measures of complementary, supplementary, vertical adjacent, and congruent angles.

https://www.illustrativemathematics.org/content-standards/7/G/B/5

Geometry

Solve real-life and mathematical problems involving angles, measure, area, surface area, and volume.

Standard 7.G.6 [*Also see G.GMD.3*] **Solve real-world and mathematical problems involving area, volume, and surface area of two-and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.**

Background knowledge needed

Substituting given information into formulas and performing the resulting computations

Matching correct formulas with the appropriate geometric shapes

iPad resources

Maths app >> Geometry >> Chapter 9: Area; also Chapter 10: Volume

MathPro!!! >> Grade 8 Math, Objective 7: Volume and Surface Area >> Chapters 1 - 9

Print resources

1. Steck-Vaughn GED Skill Book – Mathematics: Data Analysis, Statistics, Measurement, and Geometry, Lessons 12 and 13

2. Steck-Vaughn GED Mathematics (the red book), pp. 172 – 177, 301 – 311, 274 – 275, 278 – 279, 280 – 311

3. Common Core Basics Mathematics, Lessons 12.4 and 12.6

4. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 2; Unit 4, Lessons 1, 5, 7, and 9

5. Common Core Achieve, Lessons 7.1, 7.3, 7.4

6. Kaplan Big Book, Geometry: Lessons 6, 7 and 8

Online resources

https://www.khanacademy.org/commoncore/grade-7-G#7.G.B.6

https://learnzillion.com/lessonsets/452-find-the-area-volume-and-surface-area-of-two-and-three-dimensional-objects

www.quizlet.com (Enter search for Grade 7 Area, Surface area, and Volume)

www.ixl.com/math/grade-7 (Click on Geometry and scroll down to P.28: Surface Area and P.29: Volume)

https://www.illustrativemathematics.org/content-standards/7/G/B/6

Career Ready 101, Applied Math Level 6 – Area and Volume

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software.

Standard 8.G.2 [*Also see G.SRT.5*] **Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.**

Background knowledge needed

Understanding the concept of congruence: two shapes must be identical in size, with corresponding sides congruent and corresponding angles congruent. For example, if $\Delta ABC \cong \Delta XYZ$, then: $\angle A \cong \angle X$, $\angle B \cong \angle Y$, and $\angle C \cong \angle Z$; segment AB ≅ segment XY, segment BC ≅ segment YZ, and segment AC ≅ segment XZ.

iPad resources

Maths app >> Geometry >> Chapter 4: Triangles >> Congruent Figures

MathPro!!! >> Grade 7 Math, Objective 11: Similar vs Congruent >> Chapter 4

Print resources

1. Steck-Vaughn GED Mathematics Skill Book: Data Analysis, Statistics, Measurement, and Geometry, Lesson 10

2. Steck-Vaughn GED Mathematics (the red book), pp. 203 – 203

Online resources

https://www.khanacademy.org/commoncore/grade-8-G#8.G.A.2

https://learnzillion.com/lessonsets/528-understand-congruency-in-two-dimensional-figures

https://learnzillion.com/lessonsets/466-assess-congruence-using-rotations-reflections-and-translations

www.quizlet.com (Enter search for Grade 8 Congruence)

www.ixl.com/math/grade-8 (Click on Geometry and scroll down to Q11 and Q12)

https://www.illustrativemathematics.org/content-standards/8/G/A/2

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software.

Standard 8.G.4 [*Also see G. SRT.5*] **Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.**

Background knowledge needed

Understanding the concept of similar shapes, and that shapes may not look similar until one of them is flipped over or rotated in a different direction, and then enlarged.

iPad resources

Maths app >> Geometry >> Chapter 6: Similarity >> Similar Polygons

MathPro!!! >> Grade 7 Math, Objective 11: Similar vs Congruent >> Chapter 1

Print resources **(NOTE: The online resources address this standard better than the print resources do.)**

1. Steck-Vaughn Mathematics GED Skill Book: Data Analysis, Statistics, Measurement, and Geometry, Lesson 10

2. Steck-Vaughn GED Mathematics (the red book), pp. 304 – 305

3. Common Core Achieve Mathematics, Lesson 2.1

Online resources

https://www.khanacademy.org/commoncore/grade-8-G#8.G.A.4

https://learnzillion.com/lessonsets/289-describe-sequences-of-transformations-to-prove-two-figures-are-similar-or-congruent

www.quizlet.com (Enter search for Grade 8 Similar Figures)

www.ixl.com/math/grade-8 (Click on Geometry and scroll down to Q9 and Q11)

https://www.illustrativemathematics.org/content-standards/8/G/A/4

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software.

Standard 8.G.5 **Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.** *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

Background knowledge needed

Understanding that the sum of the measures of the angles of a triangle equals 180
Understanding that the sum of the measures of the angles that, when placed adjacently to form a straight line, equals 180
Understanding the concept of parallel lines cut by a transversal

iPad resources

Maths app >> Geometry >> Chapter 3: Parallel Lines & Polygons >> Intro to Parallel Lines; also, Parallel Lines; also, Triangles; also, Angles of a Triangle

MathPro!!! >> Grade 8 Math, Objective 21: Triangles and Geometry >> Chapters 3 & 4; also, Objective 6: Angles >> Chapters 4 - 7

Print resources **(NOTE: The online resources address this standard better than the print resources.)**

1. Steck-Vaughn GED Mathematics (the red book), pp. 290 – 293

Online resources

https://www.khanacademy.org/commoncore/grade-8-G#8.G.A.5

https://learnzillion.com/lessonsets/454-establish-facts-about-angle-sum-exterior-angles-transversals-and-the-angle-angle-criterion-for-similarity-of-triangles

https://learnzillion.com/lessonsets/115-understand-angle-sum-exterior-angles-angles-created-when-parallel-lines-are-cut-by-a-transversal-and-the-angle-angle-criterion-for-similarity-of-triangles

www.quizlet.com (Enter search for Grade 8 Triangle Sum Theorem; also, Parallel lines cut by a transversal)

www.ixl.com/math/grade-8 (Click on Geometry and scroll down to Q1 – Q3)

https://www.illustrativemathematics.org/content-standards/8/G/A/5

Statistics and Probability

Summarize and describe distributions.

Standard 6.SP.5 **Summarize numerical data sets in relation to their context, such as by:**

a) Reporting the number of observations.
b) Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
c) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and striking deviations from the overall pattern with reference to the context in which the data were gathered.
d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Background knowledge needed

Using arithmetic operations

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> each of the following lessons: Pictographs & Line Plots; Bar Graphs; Line Graphs; Circle Graphs; Stem-and-Leaf Plots & Frequency Tables; Histograms; Scatterplots & Trends; Misleading Graphs; Range, Median & Mode; Box-and-Whisker Plots; and Mean.

MathPro!!! >> Grade 8 Math, Objective 12: Measures of Central Tendency (Mean, Median, Mode) >> Chapters 1 – 7 and 13

Print resources

1. Steck-Vaughn GED Skill Book: Data Analysis, Statistics, Measurement, and Geometry, Lessons 1 – 5
2. Steck-Vaughn Access Mathematics, Lesson 16
3. Steck-Vaughn GED Mathematics (the red book), Unit 2 (Lessons 14 – 17)
4. Common Core Basics, Lessons 9.1 – 9.3
5. Steck-Vaughn Mathematical Reasoning, Unit 2, Lessons 3, 5, 6, and 7
6. Common Core Achieve, Lessons 8.1 – 8.4
7. Kaplan Big Book, Data, Statistics, and Probability, Lessons 1 - 6

Online resources

https://www.khanacademy.org/commoncore/grade-6-SP

https://www.khanacademy.org/commoncore/grade-6-SP#6.SP.B.5a

https://www.khanacademy.org/commoncore/grade-6-SP#6.SP.B.5b

https://www.khanacademy.org/commoncore/grade-6-SP#6.SP.B.5c

https://www.khanacademy.org/commoncore/grade-6-SP#6.SP.B.5d

https://learnzillion.com/lessonsets/213-summarize-numerical-data-sets-in-relation-to-their-context

https://learnzillion.com/lessonsets/739-summarize-numerical-data-sets-in-relation-to-their-context

www.quizlet.com (Enter search for Grade 6 Data Analysis)

www.ixl.com/math/grade-6 (All lessons under Data and Graphs and also Statistics)

https://www.illustrativemathematics.org/content-standards/6/SP/B/5

Statistics and Probability

Use random sampling to draw inferences about a population.

Standard 7.SP.1 **Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.**

Background knowledge needed

Understanding the definitions of "random," "sample" and "population"

iPad resources

NONE

Print resources

1. Steck-Vaughn Access Mathematics, Unit 4, Lesson 16

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.A.1

https://learnzillion.com/lessonsets/330-understand-statistics-and-random-sampling

www.quizlet.com (Enter search for Grade 7 Sampling populations)

www.ixl.com/math/grade-7 (Click on Statistics, AA.5)

https://www.illustrativemathematics.org/content-standards/7/SP/A/1

Statistics and Probability

Use random sampling to draw inferences about a population.

Standard 7.SP.2 **Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.** *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Background knowledge needed

Understanding the difference between "sample" and "population"

Understanding how to select a random sample

iPad resources

NONE

Print resources

NONE

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.A.2

https://learnzillion.com/lessonsets/340-draw-inferences-about-a-population-and-understand-variability

www.quizlet.com (Enter search for Grade 7 Sampling populations)

www.ixl.com/math/grade-7 (Click on Statistics, AA.5)

https://www.illustrativemathematics.org/content-standards/7/SP/A/2

Statistics and Probability

Draw informal comparative inferences about two populations.

Standard 7.SP.3 **Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.** *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*

Background knowledge needed

Understanding of the concepts of similarity and variability

iPad resources

NONE

Print resources

NONE

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.B.3

https://learnzillion.com/lessonsets/740-assess-the-degree-of-visual-overlap-of-two-numerical-data-distributions

www.quizlet.com (Enter search for 7th grade math data distribution)

https://www.illustrativemathematics.org/content-standards/7/SP/B/3

Statistics and Probability

Draw informal comparative inferences about two populations.

Standard 7.SP.4 [Also see S.ID.3] **Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.** *For example, decide whether the words in one chapter of a science book are generally longer or shorter than the words in another chapter of a lower level science book.*

Background knowledge needed

Understanding the measures of central tendency (mean, median, and mode) and the measures of variability (range, interquartile range, and standard deviation)

iPad resources

NONE

Print resources

NONE

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.B.4

https://learnzillion.com/lessonsets/706-draw-comparative-inferences-about-populations-using-measures-of-center-and-variability

https://learnzillion.com/lessonsets/300-using-measures-of-center-and-variability-to-draw-informal-comparative-inferences-1

https://learnzillion.com/lessonsets/56-use-measures-of-center-and-variability-to-make-comparative-inferences

www.quizlet.com (Enter search for 7th grade measures of center, graphs, and quartiles)

www.ixl.com/math/grade-7 (Statistics, AA.3 and AA.4)

https://www.illustrativemathematics.org/content-standards/7/SP/B/4

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 7.SP.5 **Understand that the probability of chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.**

Background knowledge needed

Ordering decimal numbers between 0 and 1

Understanding that 100% = 1

iPad resources

NONE

Print resources

1. Steck-Vaughn Access Mathematics, p. 214

2. Common Core Basics Mathematics, page 296

3. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 4

4. Common Core Achieve, Lesson 2.4

5. Kaplan Big Book, Data, Statistics, and Probability: Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.5

https://learnzillion.com/lessonsets/88-understand-the-probability-of-chance-events

www.quizlet.com (Enter search for 7th grade Probability)

www.ixl.com/math/grade-7 (Probability, Z.1)

https://www.illustrativemathematics.org/content-standards/7/SP/C

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 7.SP.6 **Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.** *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*

Background knowledge needed

Understanding the concepts of a sample space and equally likely outcomes

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Probability; also, Experimental Probability

MathPro!!! >> Grade 5 Math, Objective 8: Probability and Statistics >> Chapters 1 - 3

Print resources

1. Steck-Vaughn Mathematics GED Skill Book: Data Analysis, Statistics, Measurement, and Geometry, Lesson 5

2. Steck-Vaughn Access Mathematics, Lesson 16

3. Steck-Vaughn GED Mathematics (the red book), pp. 186 -187

4. Common Core Basics Mathematics, Lesson 10.1 and 10.2

5. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 4

6. Common Core Achieve Mathematics, Lesson 2.4

7. Kaplan Big Book: Data, Statistics, and Probability, Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.6

https://learnzillion.com/lessonsets/262-approximate-the-probability-of-a-chance-event-by-collecting-and-interpreting-data

https://quizlet.com/67273755/7sp67-probability-flash-cards/

www.ixl.com/math/grade-7 (Probability, Z.1, Z.3, and Z.4)

https://www.illustrativemathematics.org/content-standards/7/SP/C/6

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 7.SP.7 **Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.**

7.SP.7a **Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.** *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*

7.SP.7b **Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.** *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

Background knowledge needed

Understanding the concept of "equally likely" events occurring

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Simulations

MathPro!!! >> Grade 7 Math, Objective 14: Finding Probability >> Chapters 1 - 4

Print resources

Same as for standard 7.SP.6; however, see the online resources for activities to use in class.

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.7

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.7a

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.7b

https://learnzillion.com/lessonsets/305-develop-probability-models

www.quizlet.com (Enter search for 7th grade Probability)

www.ixl.com/math/grade-7 (Probability, Z.1, Z.3, and Z.4)

https://www.illustrativemathematics.org/content-standards/7/SP/C/7

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 7.SP.8a **Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the event occurs.**

Background knowledge needed

Understanding the concepts of "sample space" and "compound events"

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Probability of Independent Events

MathPro!!! >> Grade 7 Math, Objective 14: Finding Probability >> Chapter 1

Print resources

1. Steck-Vaughn Access Mathematics, Lesson 16

2. Steck-Vaughn GED Mathematics (the red book), pp. 188 -189

3. Common Core Basics Mathematics, Lesson 10.3

4. Common Core Achieve Mathematics, Lesson 2.4

5. Kaplan Big Book: Data, Statistics, and Probability, Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.8a

https://learnzillion.com/lessonsets/329-understand-and-find-probabilities-of-compound-events

www.quizlet.com (Enter search for 7th grade Probability compound events)

www.ixl.com/math/grade-7 (Probability, Z.5)

https://www.illustrativemathematics.org/content-standards/7/SP/C/8

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 7.SP.8b **Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g, "rolling double sixes"), identify the outcomes in the sample space which compose the event.**

Background knowledge needed

Understanding the concepts of "sample space" and "tree diagrams"

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Tree Diagrams and The Counting Principle

MathPro!!! >> Grade 8 Math, Objective 11: Probability and Predicting >> Chapters 1 - 4

Print resources

1. Steck-Vaughn GED Mathematics (the red book), Unit 2, Lesson 17 (frequency tables)

2. Common Core Basics, Lesson 10.1

3. Common Core Achieve, Lessons 2.3 – 2.4

4. Kaplan Big Book: Data, Statistics, and Probability, Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-7-SP#7.SP.C.8b

https://learnzillion.com/lessonsets/329-understand-and-find-probabilities-of-compound-events

www.quizlet.com (Enter search for 7th grade Probability tree diagrams)

www.ixl.com/math/grade-7 (Probability, Z.10)

https://www.illustrativemathematics.org/content-standards/7/SP/C/8

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 8.SP.1 [Also see S.ID.1] **Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patters such as clustering, outliers, positive or negative association, linear association, and nonlinear association.**

Background knowledge needed

"Positive association" relates to the graph of a line with a positive slope (rising from left to right); "negative association" relates to the graph of a line with a negative slope (falling from left to right).

Understanding the concept of data values clustering at a particular site

Understanding the concepts of "linear" and "nonlinear"

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Scatterplots & Trends; also, Box-and-Whisker Plots

MathPro!!! >> Grade 8 Math, Objective 12: Measures of Central Tendency (Mean, Median, Mode) >> Chapter 7

Print resources

1. Common Core Basics, Lesson 6.4

2. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 5

3. Common Core Achieve, Lesson 8.4

Online resources

https://www.khanacademy.org/commoncore/grade-8-SP#8.SP.A.1

https://learnzillion.com/lessonsets/143-model-and-interpret-bivariate-measurement-data

https://learnzillion.com/lessonsets/48-interpret-scatter-plots-and-describe-data-using-linear-functions

www.quizlet.com (Enter search for 8th grade Scatter plots)

www.illustrativemathematics.org/content-standards/8/SP/A./1

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 8.SP.2 **Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.**

Background knowledge needed

Understanding the concept of linear relationships (data roughly lie on a line)

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Scatterplots & Trends

MathPro!!! >> Grade 8 Math, Objective 12: Measures of Central Tendency (Mean, Median, Mode) >> Chapters 7 - 8

Print resources

1. Common Core Achieve Mathematics, Lesson 8.4

Online resources

https://www.khanacademy.org/commoncore/grade-8-SP#8.SP.A.2

https://learnzillion.com/lessonsets/670-informally-fit-straight-lines-to-scatter-plots-and-assess-fit

https://learnzillion.com/lessonsets/143-model-and-interpret-bivariate-measurement-data

www.quizlet.com (Enter search for 8th grade Scatter plots and line of best fit)

www.illustrativemathematics.org/content-standards/8/SP/A./2

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 8.SP.3 **Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.** *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning than an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*

Background knowledge needed

Understanding the concepts of slope and intercepts when dealing with a linear equation

Being able to read the graph of a line to answer questions about the graph

iPad resources

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Interpreting Graphs

Print resources

None

Online resources

https://www.khanacademy.org/commoncore/grade-8-SP#8.SP.A.3

https://learnzillion.com/lessonsets/696-use-lines-of-best-fit-to-solve-problems

https://learnzillion.com/lessonsets/254-use-the-equation-of-a-linear-model-to-solve-problems-in-the-context-of-bivariate-data

https://learnzillion.com/lessonsets/48-interpret-scatter-plots-and-describe-data-using-linear-functions

www.quizlet.com (Enter search for 8th grade Linear models)

www.illustrativemathematics.org/content-standards/8/SP/A./3

Statistics and Probability

Investigate chance processes and develop, use, and evaluate probability models.

Standard 8.SP.4 [Also see S.ID.5] **Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.** *For example, collect data from students in your class on whether or not they like to cook and whether they participate actively in a sport. Is there evidence that those who like to cook also tend to play sports?*

Background knowledge needed

Understanding how to display data in a table

Understanding how to construct a frequency table

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Stem-and-Leaf Plots & Frequency Tables

MathPro!!! >> Pre-Algebra, Objective 21: Data using Graphs/Plots >> Chapters 9 - 10

Print resources

1. Common Core Achieve, Lesson 8.4

Online resources

https://www.khanacademy.org/commoncore/grade-8-SP#8.SP.A.4

https://learnzillion.com/lessonsets/295-understand-construct-and-interpret-two-way-tables

www.illustrativemathematics.org/content-standards/8/SP/A./4