DISCLAIMERS

The OCTAE 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 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.

Number and Quantity: The Real Number System

Extend the properties of exponents to rational exponents.

Standard N.RN.2 **Rewrite expressions involving radicals and rational exponents using the properties of exponents.**

Background knowledge needed

Understanding the properties of exponents: $x^m \cdot x^n = x^{m+n}$; $(x^m)^n = x^{m \cdot n}$; $\frac{x^m}{x^n} = x^{m-n}$

iPad resources

MathPro!!! >> Algebra 2 – Part 1, Objective 3: Radical Expressions >> Lesson 12

Print resources

1. Common Core Achieve, Lesson 1.4 (the section on Radicals and Rational Exponents)

Online resources

https://www.khanacademy.org/commoncore/grade-HSN-N-RN#HSN-RN.A.2

https://learnzillion.com/lessonsets/646-rewrite-expressions-involving-radicals-and-rational-exponents

https://quizlet.com/14612245/hsn-rna2-rewrite-expressions-involving-radicals-and-rational-exponents-using-the-properties-of-exponents-flash-cards/

http://www.ixl.com/math/algebra-1 (Go to Exponents, V.9)

https://www.illustrativemathematics.org/content-standards/HSN/RN/A/2

http://www.mathworksheetsland.com/hsnumbersquan/2rewrite.html

Number and Quantity: Quantities

Reason quantitatively and use units to solve problems.

Standard N.Q.1 **Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.**

Background knowledge needed

Understanding units used in formulas

iPad resources

MathPro!!! >> PreAlgebra, Objective 11: Measurement >> Chapter 1 - 5

Print resources

1. Common Core Basics, Chapter 11 (Measurement); Lessons 9.2 and 9.3

2. Steck-Vaughn Mathematical Reasoning, Unit 2, Lessons 1, 5, 6, and 7

3. Common Core Achieve, Lesson 8.3 (histograms); Lesson 8.4 (scatter plots, line graphs)

Workforce resources

1. McGraw-Hill Workforce Career Companions (all titles), pp. 76 – 81, 84 - 91

Online resources

https://www.khanacademy.org/commoncore/grade-HSN-N-Q#HSN-Q.A.1

https://learnzillion.com/lessonsets/397-use-units-as-a-way-to-understand-and-solve-problems

http://quizlet.com/53707006/one-step-two-step-multi-step-word-problems-flash-cards/

http://www.ixl.com/math/algebra-1 (Measurement topics; also Geometry topics using formulas; also Data and Graphs topics)

https://www.illustrativemathematics.org/content-standards/HSN/Q/A/1

http://www.mathworksheetsland.com/hsnumbersquan/4prop.html

Number and Quantity: Quantities

Reason quantitatively and use units to solve problems.

Standard N.Q.3 [Also see 8.EE.4] **Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.**

Background knowledge needed

Understanding precision of measurement and reasonable measures

iPad resources

Maths app >> Pre-Algebra >> Chapter 8: Measurement >> Units of Measurement
MathPro!!! >> Grade 6 >> Objective 10: Using Appropriate Measures

Print resources

NONE

Online resources

https://www.khanacademy.org/commoncore/grade-HSN-N-Q#HSN-Q.A.3

https://learnzillion.com/lessonsets/399-choose-a-level-of-accuracy-appropriate-to-limitations-on-measurement

http://quizlet.com/subject/precision-in-measurement/

http://www.ixl.com/math/algebra-1 (Measurement, E.4)

https://www.illustrativemathematics.org/content-standards/HSN/Q/A/3

http://www.mathworksheetsland.com/hsnumbersquan/6acc.html

http://www.mathworksheetsland.com/topics/rounding/approx.html

http://www.mathworksheetsland.com/topics/rounding/sigfigs.html

Algebra: Seeing Structure in Expressions.

Interpret the structure of expressions.

Standard A.SSE.1 **Interpret expressions that represent a quantity in terms of its context.**

Background knowledge needed

Understanding how to translate words to algebraic expressions

iPad resources

Maths app >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Modeling Expressions
MathPro!!! >> Algebra 1, Part 1, Objective 8: Chapters 1 – 10

Print resources

1. Common Core Basics, Lesson 5.1

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

3. Common Core Achieve, Lesson 3.1

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

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-SSE#HSA-SSE.A.1
(See also the lessons under HSA-SSE.A.1a and HSA-SSE.A.1b)

https://learnzillion.com/lessonsets/749-interpret-quadratic-expressions-by-understanding-their-parts

https://learnzillion.com/lessonsets/649-interpret-complicated-expressions-in-context-understanding-the-meaning-of-specific-terms-factors-and-coefficients

https://quizlet.com/59979547/interpreting-expressions-flash-cards/

http://www.ixl.com/math/algebra-1 (Variable expressions and equations, I.1)

https://www.illustrativemathematics.org/content-standards/HSA/SSE/A/1

http://www.mathworksheetsland.com/algebra/1context.html

http://www.mathworksheetsland.com/algebra/2comp.html

Algebra: Seeing Structure in Expressions

Interpret the structure of expressions.

Standard A.SSE.2 **Use the structure of an expression to identify ways to rewrite it.**

For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. [Also see 7.EE.2]

Background knowledge needed

Recognizing terms that are perfect squares
Combining "like" terms

iPad resources

Maths app >> Algebra 1 >> Chapter 8: Factoring >> Factoring out the GCF; also, Factoring Trinomials; also, Advanced Factoring Trinomials; also, Difference of Two Squares; also Trinomials with Lead Coefficients; also, Advanced Trinomials with Lead Coefficients; also, Factoring Completely

MathPro!!! >> Algebra 1, Part 2, Objective 13: Factoring >> Chapters 1 - 7

Print resources

1. Steck-Vaughn GED Mathematics (the red book), Lesson 21

2. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 8

3. Common Core Achieve Mathematics, Lesson 4.2

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-SSE#HSA-SSE.A.2

https://learnzillion.com/lessonsets/718-use-the-structure-of-an-expression-to-identify-ways-to-rewrite-it

http://www.ixl.com/math/algebra-1 (Factoring, all lessons)

https://www.illustrativemathematics.org/content-standards/HSA/SSE/A/2

http://www.mathworksheetsland.com/algebra/3rewr.html

Algebra: Seeing Structure in Expressions

Write expressions in equivalent forms to solve problems.

Standard A.SSE.3 [Also see 7.EE.2] **Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.**

A.SSE.3a [Also see 7.EE.2] **Factor a quadratic expression to reveal the zeroes of the function it defines.**

Background knowledge needed

Understanding how to find the Greatest Common Factor (GCF) of two or more terms

Understand how to factor a trinomial or the difference of two squares

iPad resources

Maths app >> Algebra 1 >> Chapter 8: Factoring >> Polynomial Equations; also, Intermediate Polynomial Equations
MathPro!!! >> Algebra 1, Part 2, Objective 15: Quadratics >> Lesson 3

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 246 – 247

2. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 8

3. Common Core Achieve Mathematics, Lesson 4.3

4. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 4

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-SSE#HSA-SSE.B.3

https://www.khanacademy.org/commoncore/grade-HSA-A-SSE#HSA-SSE.B.3a

https://www.khanacademy.org/commoncore/grade-HSA-A-SSE#HSA-SSE.B.3b

https://learnzillion.com/lessonsets/625-factor-a-quadratic-expression-to-reveal-the-zeros-of-the-function-it-defines

https://learnzillion.com/lessonsets/502-factor-a-quadratic-expression-to-reveal-the-zeros-of-the-function-it-defines

https://learnzillion.com/lessonsets/218-factor-a-quadratic-expression-to-reveal-the-zeros-of-the-function

https://learnzillion.com/lessonsets/171-factor-a-quadratic-equation-to-reveal-the-zeros-of-the-function-it-describes

www.quizlet.com (Enter search for *Solve quadratic equations by factoring*)

http://www.ixl.com/math/algebra-1 (Quadratic equations, BB.4, BB.5, and BB.6)

https://www.illustrativemathematics.org/content-standards/HSA/SSE/B/3

http://www.mathworksheetsland.com/algebra/4solve.html

Algebra: Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

Standard A.APR.1 **Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. [Note from panel: Emphasis should be on operations with polynomials.]**

Background knowledge needed

Understanding how to combine "like terms" by adding or subtracting their coefficients

Understanding the distributive property of multiplication

iPad resources

Maths app >> Algebra 1 >> Chapter 1: Simplifying >> Combining Like Terms; also, Distributive Property; also, Simplifying Expressions

Maths app >> Algebra 1 >> Chapter 7: Exponents & Polynomials >> Multiplying Polynomials; also, FOIL Method

MathPro!!! >> Algebra 1, Part 2, Objective 12: Polynomials >> Chapters 1 - 7

Print resources

1. McDougal Littell Algebra 1, Lessons 2.6, 10.1, 10.2

2. Steck-Vaughn GED Mathematics (the red book), pp. 216 -271; pp. 242 -243

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 8

4. Common Core Achieve, Lesson 4.1

5. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lessons 8, 9, 10, and 11

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-APR#HSA-APR.A.1

https://learnzillion.com/lessonsets/558-understand-that-polynomials-are-closed-under-addition-subtraction-and-multiplication-add-subtract-and-multiply-polynomials

http://quizlet.com/subject/operations-with-polynomials/

http://www.ixl.com/math/algebra-1 Under Polynomials, Use lessons Z.1 – Z.10

https://www.illustrativemathematics.org/content-standards/HSA/APR

https://www.youtube.com/watch?v=vuQjN45mQEM&list=PLkZwAghwrSytqIJlef1yYtq7E51iKXVCY&index=23

https://www.youtube.com/watch?v=9pLHU0DFyCM&list=PLkZwAghwrSytqIJlef1yYtq7E51iKXVCY&index=24

https://www.youtube.com/watch?v=DaWEAXH2YGc&list=PLkZwAghwrSytqIJlef1yYtq7E51iKXVCY&index=25

http://www.mathworksheetsland.com/algebra/8poly.html

http://www.mathworksheetsland.com/algebra/9polymul.html

Algebra: Arithmetic with Polynomials and Rational Expressions

Rewrite rational expressions

Standard A.APR.6 **Rewrite simple rational expressions in different forms; write a(x) / b(x) in the form q(x) + r(x) / b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.**

(Simplified: Divide a polynomial by a monomial or a binomial, and write the remainder in fraction form over the divisor.)

Background knowledge needed

Factoring polynomials

Dividing one monomial by another monomial

iPad resources

Maths app >> Algebra 1 >> Chapter 7: Exponents & Polynomials >> Quotient Rule; also, Chapter 9: Rational Expressions & Equations >> Rational Expressions; also, Multiplying/Dividing Rational Expressions

MathPro!!! >> Algebra 1, Part 2, Objective 12: Polynomials >> Chapters 8 – 10

Print resources

1. McDougal Littell Algebra 1, Lessons 11.4 and 11.7

2. Kaplan Big Book: Algebra Basics, Expressions, and Polynomials, Lesson 12

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-APR#HSA-APR.D.6

https://learnzillion.com/lessonsets/599-rewrite-simple-rational-expressions-in-different-forms

http://quizlet.com/subject/dividing-polynomials/

http://www.ixl.com/math/algebra-1 Rational Functions and Expressions: GG.3 and GG.5

https://www.illustrativemathematics.org/content-standards/HSA/APR/D/6

https://www.youtube.com/watch?v=vuQjN45mQEM&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY&index=23

https://www.youtube.com/watch?v=9pLHU0DFyCM&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY&index=24

http://www.mathworksheetsland.com/algebra/14rewrite.html

Algebra: Creating Equations

Create equations that describe numbers or relationships.

Standard A.CED.1 [Also see 7.EE.4, 7.EE.4a, and 7.EE.4b] **Create equations and inequalities in one variable and use them to solve problems.** *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

Background knowledge needed

Translating from words to symbols

Understanding key phrases that indicate which operation(s) to use when writing the equation or inequality

iPad resources

Maths app >> Pre-Algebra >> Chapter 5: Algebraic Thinking >> Writing One-Step Equations; also, Writing Two-Step Equations

MathPro!!! >> Algebra 1, Part 2, Objective 2: Linear Equations and Inequalities >> Chapters 5 - 8

Print resources

1. McDougal Littell Algebra 1, Lessons 3.1, 3.2, 3.3, 3.4, 3.5, 6.2, 6.3 (Use the sections on Modeling/Solving Real-Life Problems)

2. Steck-Vaughn GED Mathematics (the red book), pp. 224 – 229; 248 – 249

3. Common Core Basics, Lesson 5.2, 5.3, and 5.4

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lessons 6 and 10

5. Common Core Achieve, Lesson 3.4

6. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 2

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-CED#HSA-CED.A.1

https://learnzillion.com/lessonsets/677-create-and-use-equations-and-inequalities-in-one-variable

www.quizlet.com (Enter search for *Create one-variable equations*; also search for *Create one-variable inequalities*)

http://www.ixl.com/math/algebra-1 Variable Expressions and Equations, I.3; also Linear Inequalities, T.4

https://www.illustrativemathematics.org/content-standards/HSA/CED/A

http://www.mathworksheetsland.com/algebra/17createeq.html

Algebra: Creating Equations

Create equations that describe numbers or relationships.

Standard A.CED.2 **Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.**

Background knowledge needed

Translating from words to symbols

Understanding key phrases that indicate which operation(s) to use when writing the equation or inequality

Graphing points on the coordinate plane

iPad resources

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >> Linear Function Word Problems; also, Direct Variation Word Problems

MathPro!!! >> Algebra 1, Part 2, Objective 2: Linear Equations and Inequalities >> Chapters 7 – 8; Objective 3: Verbal Expressions/Equations >> Chapters 3 – 5; Objective 15: Quadratics >> Chapters 1 and 6; Objective 19: Direct and Inverse Variation >> Chapters 1 - 6

Print resources

1. McDougal Littell Algebra 1, Lessons 5.6 and 5.7

2. Kaplan Big Book: Equations, Inequalities, and Functions: Lessons 2, 5, 6, and 7

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-CED#HSA-CED.A.2

https://learnzillion.com/lessonsets/484-create-and-graph-equations-in-more-than-one-variable

www.quizlet.com (Enter search for *Create equations to represent relationships between quantities*)

http://www.ixl.com/math/algebra-1 Relations and functions, Q.9, Q.10; also Direct and inverse variation, R.1 – R.5

https://www.illustrativemathematics.org/content-standards/HSA/CED/A/2

http://www.mathworksheetsland.com/algebra/18equal.html

http://www.mathworksheetsland.com/algebra/19graph.html

Algebra: Creating Equations

Create equations that describe numbers or relationships.

Standard A.CED.3 **Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.** *For example, represent inequalities describing nutritional and cost constraints on combinations of different food.*

Background knowledge needed

Understanding the reasonableness of a solution (for example, time and distance cannot be negative numbers)

Understanding that parallel lines have no points in common, so there is no solution to a system of equations that graph as parallel lines

iPad resources

MathPro!!! >> Algebra 1, Part 1, Objective 6: Solving Equations and Inequalities >> Chapter 6; also, Objective 10 >> Chapters 3 and 4

Print resources

1. McDougal Littell Algebra 1, Lesson 3.4, 6.5, and 7.5

2. Common Core Basics, Lesson 5.2, 5.4, and 6.3

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

4. Common Core Achieve, Lesson 3.4

5. Kaplan Big Book: Equations, Inequalities, and Functions, Lessons 1, 2, and 3

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-CED#HSA-CED.A.3

https://learnzillion.com/lessonsets/667-represent-constraints-by-equations-inequalities-and-systems

http://www.ixl.com/math/algebra-1 Solve equations: J.7; Single-variable inequalities: K.3; Linear Inequalities: T.1; Systems of linear equations: U.1

https://www.illustrativemathematics.org/content-standards/HSA/CED/A/3

http://www.mathworksheetsland.com/algebra/20egorin.html

Algebra: Creating Equations

Create equations that describe numbers or relationships.

Standard A.CED.4 **Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.** *For example, rearrange Ohm's law V = IR to highlight resistance R.*

Background knowledge needed

Understanding how to solve a simple equation for a missing variable

iPad resources

Maths app >> Algebra 1 >> Chapter 2: Equations >> Literal Equations

MathPro!!! >> Algebra 1, Part 1, Objective 7: Literal Equations >> Chapters 1 - 6

Print resources

1. McDougal Littell Algebra 1, Lesson 3.7

Workforce resources

1. McGraw-Hill Workforce Career Companions (all titles), pp. 86 - 87

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-CED#HSA-CED.A.4

https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/solving_for_variable/v/rearrange-formulas-to-isolate-specific-variables

https://learnzillion.com/lessonsets/547-rearrange-formulas-to-highlight-a-quantity-of-interest

http://quizlet.com/67799614/rearranging-formulae-flash-cards/

http://www.ixl.com/math/algebra-2 Equations: B.5

https://www.illustrativemathematics.org/content-standards/HSA/CED/A/4

http://www.mathworksheetsland.com/algebra/21under.html

Algebra: Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning.

Standard A.REI.1 **Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution.**

Background knowledge needed (NOTE: See the next page for properties used for solving equations.)

Understanding the addition, subtraction, multiplication, and division properties of equality

Understanding additive inverses and multiplicative inverses

Understanding the distributive property of multiplication over addition and subtraction

Understanding that the equation must remain balanced: that whatever operation we perform on one side of the equals sign also has to be performed on the opposite side of the equals sign

iPad resources

Maths app >> Algebra 1 >> Chapter 2: Equations >> One-Step Equations; also, Two-Step Equations; also, Multi-Step Equations; also, Variables on Both Sides

MathPro!!! >> Algebra 1, Part 1, Objective 9: Properties >> Chapters 1 - 5

Print resources

1. McDougal Littell Algebra 1, Lessons 3.1 – 3.4

2. Steck-Vaughn GED Mathematics (the red book), Lesson 19

3. Common Core Basics Mathematics, Lessons 5.2 – 5.3

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

5. Common Core Achieve, Lesson 3.2

6. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 1

Workforce resources

1. McGraw-Hill Workforce Career Companions (all titles), pp. 84 - 87

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.A.1

https://learnzillion.com/lessonsets/203-solve-and-explain-simple-algebraic-equations

http://quizlet.com/2738397/properties-of-equality-flash-cards/

http://www.ixl.com/math/algebra-1 Properties: H.1 – H.4

https://www.illustrativemathematics.org/content-standards/HSA/REI/A

Properties of Equality
Ways to Justify Solution Methods

Addition Property of Equality

If $a = b$, then $a + c = b + c$. (You can add the same number to both sides of an equation, and it does not change the truth of the equation.

Example: If $x - 5 = 9$, then $x - 5 + 5 = 9 + 5$.

Subtraction Property of Equality

If $a = b$, then $a - c = b - c$. (You can subtract the same number from both sides of an equation, and it does not change the truth of the equation.)

Example: If $x + 3 = 12$, then $x + 3 - 3 = 12 - 3$.

Multiplication Property of Equality

If $a = b$, then $ac = bc$. (You can multiply both sides of an equation by the same number, and it does not change the truth of the equation.)

Example: If $\frac{1}{2} x = 6$, then $(\frac{1}{2} x)(2) = (6)(2)$.

Division Property of Equality

If $a = b$ and $c \neq 0$, then $a/c = b/c$. (You can divide both sides of an equation by the same number – except by 0 – and it does not change the truth of the equation.)

Example: If $3x = 24$, then $\frac{3x}{3} = \frac{24}{3}$.

Reflexive Property of Equality

$a = a$ (Every number or expression equals itself.)

Example: $2x + 7 = 2x + 7$.

Symmetric Property of Equality

If $a = b$, then $b = a$. (You can switch the left and ride sides of an equation without changing the truth of the equation. Many students prefer that the variable is always on the left side of the equation, and this property lets them switch the sides.)

Example: If $18 = 3x + 3$, then $3x + 3 = 18$.

Transitive Property of Equality

If $a = b$ and $b = c$, then $a = c$. (If a first expression equals a second, and the second expression equals a third, then the first expression equals the third expression.)

Example: If $5x + 1 = 3y - 2$, and $3y - 2 = 26$, then $5x + 1 = 26$.

Substitution Property of Equality

If $a = b$, then a can replace b in any expression. (You can substitute one expression for the other, as long as they equal each other.)

Example: Since 2 + 3 = 5, you can substitute 5 for 2 + 3 in this expression: x = 2 + 3.

Commutative Property of Addition (or Multiplication)

$a + b = b + a$. Also, $ab = ba$. (You can change the order in which you add a group of numbers or multiply numbers. This property does not work for subtraction or division!)

Example: When adding a group of numbers like 6 + 3 + 4+ 7, you can group them as 3 + 7 + 4 + 6 – pairing numbers to add up to 10 – to make the addition easier to do mentally.

Also, when multiplying numbers like (6)(7)(1/2), you can group them as (6)(1/2)(7) so you can take half of a smaller number (6) rather than the product (42).

Associative Property of Addition (or Multiplication)

$(a + b) + c = a + (b + c)$. Also, $(ab)(c) = a(bc)$. (You can change the way you group addition and multiplication. This property does not work for subtraction or division!

Example: $(5 + 6) + 4 = 5 + (6 + 4)$. Also, $(3/4 \cdot 8) \cdot 2 = ¾(8 \cdot 2)$.

Additive Identity

$a + 0 = a$ (Adding 0 to a number does not change the number.)

Example: 18 + 0 = 18

Multiplicative Property of 0

$a \cdot 0 = 0$ (Any number multiplied by 0 equals 0.)

Example: $12 \cdot 0 = 0$

Multiplicative Identity

$a \cdot 1 = a$. (Any number multiplied by 1 equals the same number.)

Example: $17 \cdot 1 = 17$

Distributive Property of Multiplication over Addition

$a(b + c) = ab + ac$ (Multiply everything inside the parentheses by the factor outside the parentheses.)

Example: $3(2x + 8) = 3(2x) + 3(8)$.

Algebra: Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning.

Standard A.REI.2 [Also see 8.EE.2] **Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**

Background knowledge needed

Finding the Least Common Multiple; using the LCM to multiply every term of the equation to eliminate denominators

Understanding that the denominator of a rational expression cannot equal 0 (extraneous solutions)

Factoring quadratic equations

iPad resources

Maths app >> Algebra 1 >> Chapter 9: Rational Expressions & Equations >> Rational Equations

MathPro!!! >> Algebra 1, Part 1, Objective 7: Radical/Rational Equations >> Chapters 1 - 3

Print resources

1. McDougal Littell Algebra 1, Lesson 11.1
2. Common Core Basics, Lesson 5.3
3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 9
4. Common Core Achieve, Lesson 3.2

Workforce resources

1. McGraw-Hill Workforce Career Companions (all titles), pp. 84 - 87

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.A.2

https://learnzillion.com/lessonsets/501-solve-simple-rational-radical-equations-in-one-variable

http://quizlet.com/subject/A.REI.2-solving-simple-rational-equations/

http://www.ixl.com/math/algebra-2 Rational functions and expressions, N.7; also, Radical functions and expressions, L.13

https://www.illustrativemathematics.org/content-standards/HSA/REI/A/2

http://www.mathworksheetsland.com/algebra/23solve.html

Algebra: Reasoning with Equations and Inequalities

Solve equations and inequalities in one variable.

Standard A.REI.3 [Also see 7.EE.4, 7.EE.4a, 7.EE.4b, and 8.EE.7] **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.**

Background knowledge needed

Using the properties of equality: addition, subtraction, multiplication, and division; also using the distributive property.

Understanding that dividing both sides of an inequality requires reversing the inequality symbol.

iPad resources

Maths app >> Algebra 1 >> Chapter 2: Equations (all lessons); also, Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Solving Inequalities

MathPro!!! >> Algebra 1, Part 1, Objective 4: Simple Linear Equations >> Chapters 1 – 5; also, Objective 5: Simple Linear Inequalities >> Chapters 1 - 5

Print resources

1. McDougal Littell Algebra 1, Lessons 3.1 – 3.4, 3.7, 6.1, and 6.2

2. Steck-Vaughn GED Mathematics (the red book), Lesson 19 (equations); also, pp. 248 – 249 (inequalities)

3. Common Core Basics Mathematics, Lessons 5.2, 5.3, and 5.4

4. Steck-Vaughn Mathematical Reasoning, Unit 3, Lessons 6 and 10

5. Common Core Achieve Mathematics, Lessons 3.2 and 3.3

6. Kaplan Big Book: Equations, Inequalities, and Functions, Lessons 1 and 3

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.B.3

https://learnzillion.com/lessonsets/741-solve-linear-equations-and-inequalities-in-one-variable

http://quizlet.com/subject/solving-equations-and-inequalities/

http://www.ixl.com/math/grade-8 Single-variable equations, U.4, U.5, U.7, & U.8; also Inequalities, X.4, X.6, and X.8

https://www.illustrativemathematics.org/content-standards/HSA/REI/B/3

http://www.mathworksheetsland.com/algebra/24inequal.html

Algebra: Reasoning with Equations and Inequalities

Solve equations and inequalities in one variable.

Standard A.REI.4 **Solve quadratic equations in one variable.**

Background knowledge needed

Factoring trinomials and factoring the difference of squares

Substituting into the quadratic formula

iPad resources

Maths app >> Algebra 2 >> Chapter 11: Quadratics >> Square Root Method; also, Completing the Square; also Quadratic Formula; also, Advanced Quadratic Equations

MathPro!!! >> Algebra 2, Part 1, Objective 6: Solving Quadratics >> Chapters 1 – 6

Print resources

1. McDougal Littell Algebra 1, Lesson 10.4, 10.5, 10.6, 10.7, and 10.8
2. Steck-Vaughn GED Mathematics (the red book), pp. 246 – 247
3. Common Core Achieve Mathematics, Lesson 4.3
4. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 4

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.B.4

https://learnzillion.com/lessonsets/24-solve-quadratic-equations

www.quizlet.com (Enter search for *Solving Quadratic Equations*)

http://www.ixl.com/math/algebra-1 Quadratic Equations, BB.4, BB.5, BB.6, BB.7, BB.8, and BB.9

https://www.illustrativemathematics.org/content-standards/HSA/REI/B/4

http://www.mathworksheetsland.com/algebra/25quads.html

http://www.mathworksheetsland.com/algebra/26squares.html

http://www.mathworksheetsland.com/algebra/27quadfatcs.html

http://www.mathworksheetsland.com/algebra/28quaduse.html

Algebra: Reasoning with Equations and Inequalities

Solve systems of equations.

Standard A.REI.6 [Also see 8.EE.8b] **Solve systems of linear equations exactly and approximately (e.g., with graphs, focusing on pairs of linear equations in two variables).**

*****LCAE note: Because the student has time constraints during the GED test, we recommend teaching solving systems of linear equations exactly by using the linear combination method (a/k/a the addition method or the elimination method). The substitution method and graphing method often take the student considerably longer to solve.*****

Background knowledge needed

Graphing linear equations on a coordinate grid

Properties of equality: Addition, Subtraction, Multiplication, and Division; Additive Inverse Property

iPad resources

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

MathPro!!! >> Algebra 1, Part 2, Objective 10: Graphing Systems of Equalities/Inequalities >> Chapters 5 – 7

Print resources

1. McDougal Littell Algebra 1, Lessons 7.1, 7.3, and 7.5

2. Common Core Basics Mathematics, Lesson 6.3

3. Common Core Achieve Mathematics, Lesson 5.4

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

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.C.6

https://learnzillion.com/lessonsets/247-solve-systems-of-linear-equations-exactly-and-approximately

https://quizlet.com (Enter search for *Solving systems of linear equations*)

http://www.ixl.com/math/algebra-1 Systems of linear equations, U.2, U.8, and U.10

https://www.illustrativemathematics.org/content-standards/HSA/REI/C

http://www.mathworksheetsland.com/algebra/30systems.html

Algebra: Reasoning with Equations and Inequalities

Represent and solve equations and inequalities graphically.

Standard A.REI.10 [Also see 8.F.5] **Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).**

Background knowledge needed

Writing an equation in slope-intercept form ($y = mx + b$), and then using the slope, m, and the y-intercept, b, to draw the line on the coordinate grid

iPad resources

Maths app >> Algebra 1 >> Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Graphing Lines; also, Graphing Lines – Intercept Method; also, Chapter 11: Quadratics >> Graphing Quadratic Equations

Math Pro!!! >> Algebra 1, Part 1, Objective 15: Graphing Lines >> Chapters 1 – 4; also, Algebra 1, Part 2, Objective 15: Quadratics >> Chapters 1 – 2; also, Algebra 2, Part 1, Objective 15: Identifying Graphs >> Chapter 2

Print resources

1. McDougal Littell Algebra 1, Lesson 4.2, 4.3, and 4.6 (lines); Lesson 9.3 (parabolas)

2. Steck-Vaughn GED Mathematics (the red book), pp. 254 – 255

3. Common Core Basics Mathematics, Lesson 6.2 (lines)

4. Steck-Vaughn Mathematical Reasoning, Unit 3: Lessons 12 and 15

5. Common Core Achieve Mathematics, Lesson 5.3 (lines); pp. 212 – 213 (parabolas)

6. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 7 (lines)

Online resources

https://www.khanacademy.org/commoncore/grade-HSA-A-REI#HSA-REI.D.10

https://learnzillion.com/lessonsets/629-understand-that-the-graph-of-an-equation-in-two-variables-is-the-set-of-all-its-solutions

http://quizlet.com/56340138/linear-equations-in-two-variables-flash-cards/

http://www.ixl.com/math/algebra-1 Linear functions: S.6, S.13, S.14, S.15, S.16; also, Functions: linear, quadratic, exponential, CC.1

https://www.illustrativemathematics.org/content-standards/HSA/REI/D/10

http://www.mathworksheetsland.com/algebra/36eggraphs.html

Functions: Interpreting Functions

Understand the concept of a function and use function notation.

Standard F.IF.1 [Also see 8.F.1] **Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f(x)* denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y = f(x)*.**

Background knowledge needed

Understanding the concepts of domain and range (domain = x- values; range = corresponding *y*-values. For each value of x, there can be only one corresponding value of *y*.

Examples: {(1,4), (2,7), (1,8)} is NOT a function because the *x*-value in the first ordered pair corresponds to 4, but then it corresponds to 8 in the third ordered pair.

{(1,4), (2,7), (3,8)} IS a function because each x-value corresponds to only one *y*-value.

iPad resources

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

MathPro!!! >> Algebra 1, Part 1, Objective 12: Functions >> Chapters 1 - 12

Print resources

1. McDougal Littlell 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 Mathematics, Lesson 6.1
6. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 11

Online resources

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

https://learnzillion.com/lessonsets/745-understand-the-relationship-between-domain-and-range-and-use-f-x-notation

http://quizlet.com/12856844/hsa-algebra-functions-flash-cards/

http://www.ixl.com/math/algebra-1 Relations and functions, Q.1 – Q.5

https://www.illustrativemathematics.org/content-standards/HSF/IF

https://www.youtube.com/watch?v=a0MM6HGzTwY&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY&index=8

http://www.mathworksheetsland.com/functions/1relationsset.html

Functions: Interpreting Functions

Understand the concept of a function and use function notation.

Standard F.IF.2 **Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.**

Background knowledge needed

Understanding the difference between input (domain) and output (range)

Realizing that an equation in the form *y = f(x)* represents a function

iPad resources

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

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Recognizing and Evaluating Functions

MathPro!!! >> Algebra 1, Part 1, Objective 12: Functions >> Chapters 5 - 7

Print resources

1. McDougal Littell Algebra , Lesson 4.8

2. Common Core Achieve Mathematics, Lesson 6.1

Online resources

https://www.khanacademy.org/commoncore/grade-HSF-F-IF#HSF-IF.A.2

https://learnzillion.com/lessonsets/620-evaluate-functions-use-function-notation-and-interpret-statements-that-use-function-notation

http://quizlet.com/subject/evaluating-algebra-functions/

http://www.ixl.com/math/algebra-1 Relations and functions, Q.7 and Q.8

https://www.illustrativemathematics.org/content-standards/HSF/IF/A/2

http://www.mathworksheetsland.com/functions/2domainsset.html

Functions: Interpreting Functions

Interpret functions that arise in applications in terms of the context.

Standard F.IF.4 **For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.** *For example, for a quadratic function modeling a projectile in motion, interpret the intercepts and the vertex of the function in the context of the problem. (Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.)*

Background knowledge needed

Understanding the concept of a function

Identifying key features of a graph

iPad resources

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Recognizing and Evaluating Functions; also, Interpreting Graphs

MathPro!!! >> Algebra 1, Part 2, Objective 21: More Function Properties >> Chapters 2 and 5; also, Algebra 2, Part 1, Objective 9: Functions, Domain, Range, etc. >> Chapter 8

Print resources

1. McDougal Littell Algebra 1, Lessons 4.3, 9.3, and 9.4

2. Steck-Vaughn Mathematical Reasoning, Lesson 17

3. Common Core Achieve Mathematics, Lesson 6.3

4. Kaplan Big Book: Equations, Inequalities, and Functions: Lesson 12

Online resources

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

https://learnzillion.com/lessonsets/477-graph-quadratic-functions-and-show-intercepts-maxima-and-minima

http://quizlet.com/40997973/key-features-of-graphs-flash-cards/

http://www.ixl.com/math/algebra-2 Parabolas, T.1 – T.4

https://www.illustrativemathematics.org/content-standards/HSF/IF/B/4

Functions: Interpreting Functions

Interpret functions that arise in applications in terms of the context.

Standard F.IF.5 **Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.** *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

Background knowledge needed

Understanding the concept of the domain of a function – what are the possible inputs? Which inputs would not make sense?

iPad resources

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Domain and Range

MathPro!!! >> Algebra 1, Part 2, Objective 21: More Function Properties >> Chapter 3

Print resources

1. Common Core Achieve, Lesson 6.1 (This lesson loosely ties to the standard, but not exactly. See online resources for better matches to the standard.)

Online resources

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

https://learnzillion.com/lessonsets/679-relate-the-domain-of-a-function-to-its-graph

http://quizlet.com/17646786/functions-their-graphs-flash-cards/

http://www.ixl.com/math/algebra-1 Exponential functions, X.2 ; also, Functions: linear, quadratic, and exponential, CC.1; Absolute value functions, DD.2 and DD.3

https://www.illustrativemathematics.org/content-standards/HSF/IF/B/5

http://www.quickanddirtytips.com/education/math/what-are-the-domain-and-range-of-a-function

http://www.mathworksheetsland.com/functions/6funvrelatset.html

Functions: Interpreting Functions

Interpret functions that arise in applications in terms of the context.

Standard F.IF.6 **Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. [NOTE: See conceptual modeling categories.)**

Background knowledge needed

Understanding the concept of slope as a rate of change

iPad resources

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

MathPro!!! >> Algebra 1, Part 1, Objective 16: Slope >> Chapters 1 - 6

Print resources

1. McDougal Littell Algebra 1, Lesson 4.4

2. Steck-Vaughn Mathematical Reasoning, Unit 3, Lessons 13 and 17

3. Common Core Achieve, Lessons 5.1 and 6.4

4. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 8

Online resources

https://www.khanacademy.org/commoncore/grade-HSF-F-IF#HSF-IF.B.6

http://quizlet.com/45579458/rate-of-change-flash-cards/

http://www.ixl.com/math/algebra-1 Linear Functions, S.2 and S.3

https://www.illustrativemathematics.org/content-standards/HSF/IF/B/6

https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1LDJZ_enUS583US586&ion=1&espv=2&ie=UTF-8#q=math+dude+slope

http://www.mathworksheetsland.com/functions/7rateofchangeset.html

Functions

Analyze functions using different representations.

Standard F.IF.7 [Also see 8.F.5] **Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.**

Background knowledge needed

Graphing in the coordinate plane

Setting up a table with the function rule, choosing values for x (the domain), and calculating the resulting values for y (the range)

iPad resources

Maths app >> Algebra 2 >> Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Graphing Lines; also, Graphing Lines – Intercept Method

Maths app >> Algebra 1 >> Chapter 11: Quadratics >> Graphing Quadratic Equations

MathPro!!! >> Grade 8 Math, Objective 16: Graphing Lines and Finding Slope >> Chapters 2 and 21

Print resources

1. McDougal Littell Algebra 1, Chapter 4 (all lessons); also, Lesson 9.3

2. Common Core Basics Mathematics, Lesson 6.5

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

4. Common Core Achieve Mathematics, Lesson 6.1

5. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 7

Online resources

https://www.khanacademy.org/commoncore/grade-HSF-F-IF#HSF-IF.C.7

https://learnzillion.com/lessonsets/477-graph-quadratic-functions-and-show-intercepts-maxima-and-minima

http://quizlet.com/subject/graphing-functions/

http://www.ixl.com/math/algebra-1 Linear Functions, S.6, S.13, S.15, S.16; also, Absolute Value Functions, DD.1, DD.2, and DD.3

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

https://www.youtube.com/watch?v=aZbJUau4cD4

http://www.mathworksheetsland.com/functions/8graphlinearset.html

Functions

Analyze functions using different representations.

Standard F.IF.8b [Also see 8.EE.1] **Use properties of exponents to interpret expressions for exponential functions.** *For example, identify percent rate of change in an exponential function and then classify it as representing exponential growth or decay.*

Background knowledge needed

Understanding how to use the properties of exponents

iPad resources

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

Print resources

1. McDougal Littell Algebra 1, Lessons 8.2, 8.5, and 8.6

2. Common Core Basics Mathematics, Lesson 6.4 (pp. 192 – 194)

Online resources

https://www.khanacademy.org/commoncore/grade-HSF-F-IF#HSF-IF.C.8b

https://learnzillion.com/lessonsets/601-use-the-properties-of-exponents-to-interpret-expressions-and-functions

http://quizlet.com/subject/exponential-functions/

http://www.ixl.com/math/algebra-1 Functions: linear, quadratic, exponential, CC.6

http://www.ixl.com/math/algebra-2 Exponential and logarithmic functions, S.2, S.3,and S.4

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

https://www.youtube.com/watch?v=cvzzsUQHMpw

http://www.mathworksheetsland.com/functions/14expressexpfunset.html

Functions

Analyze functions using different representations.

Standard F.IF.9 **Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).** *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*

Background knowledge needed

Understanding how to determine the rate of change (slope) given an equation in the form of $y = mx + b$, or by calculating the slope if given two or more ordered pairs on a line, or by determining rise/run from a graph, etc.

iPad resources

Maths app >> Algebra 1 >> Chapter 4: Inequalities, Absolute Value, Functions, Graphing >> Graphing Lines; also, Chapter 5: Linear Equations >> Slope as a Rate of Change; also, Slope of a Line; also, Slope of a Line – Graphs and Tables

MathPro!!! >> Algebra 1, Part 2, Objective 8: Finding Slope >> Chapters 1 - 3

Print resources

1. McDougal Littell Algebra 1, Lessons 4.4 and 4.6

2. Common Core Basics Mathematics, Lessons 6.1 and 6.2

3. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 17

4. Common Core Achieve Mathematics, Lesson 6.4

Online resources

https://www.khanacademy.org/commoncore/grade-HSF-F-IF#HSF-IF.C.9

http://quizlet.com/subject/comparing-functions/

http://www.ixl.com/math/algebra-1 Functions: linear, quadratic, exponential, CC.1 and CC.2; also, Linear functions: S.2, S.3, S.5, S.6, S.7

https://www.illustrativemathematics.org/content-standards/HSF/IF/C/9

http://www.mathworksheetsland.com/functions/15comparingfuncset.html

Functions: Building Functions

Build a function that models a relationship between two quantities.

Standard F.BF.1 [Also see 8.F.4] **Write a function that describes a relationship between two quantities.**

Background knowledge needed

Understanding the definition of a function (each member of the domain pairs with exactly one member of the range)

Being able to work out relationships between quantities

iPad resources

Maths app >> Algebra 1 >> Additional NCTM Concepts >> Finite Differences to Generalize a Rule

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >>Writing Linear Equations – Using Graphs; also, Writing Linear Equations – Using Charts; also, Chapter 11: Quadratics >> Linear or Quadratic

MathPro!!! >> Algebra 1, Part 2, Objective 9: Writing Linear Equations >> Chapters 1 - 6

Print resources

1. McDougal Littell Algebra 1, Chapter 5 (all lessons)

2. Common Core Basics Mathematic, Lesson 5.5

3. Steck-Vaughn Mathematics, Unit 3, Lesson 5

4. Common Core Achieve Mathematics, Lessons 5.4 and 6.1

5. Kaplan Big Book: Equations, Inequalities, and Functions, Lesson 12

Online resources

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

https://learnzillion.com/lessonsets/765-write-a-function-that-describes-a-linear-relationship-between-two-quantities

https://learnzillion.com/lessonsets/770-write-a-function-that-describes-an-exponential-relationship-between-two-quantities

http://quizlet.com/9671047/writing-a-function-rule-flash-cards/

http://www.ixl.com/math/algebra-1 Linear functions: S.10 and S.11; also, Functions: linear, quadratic, exponential, CC.3

https://www.illustrativemathematics.org/content-standards/HSF/BF/A/1

Functions: Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems.

Standard F.LE.1 **Distinguish between situations that can be modeled with linear functions and with exponential functions.**

F.LE.1b **Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.**

F.LE.1c **Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.**

Background knowledge needed

Understanding the concept of a linear function (constant rate of change)

Understanding the concept of an exponential function (growth and decay)

iPad resources

MathPro!!! >> Algebra 2, Part 1, Objective 15: Identifying Graphs >> Chapter 2

Print resources

1. McDougal Littell Algebra 1, Lessons 4.4 (slope as rate of change), 4.8 (writing and using a linear function), 8.2 (graphing exponential functions), 8.5 (exponential growth), 8.6 (exponential decay)

Online resources

We recommend watching the YouTube video first - the next-to-the-last link on this page.

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

https://learnzillion.com/lessonsets/35-distinguish-between-linear-functions-and-exponential-functions

https://learnzillion.com/lessonsets/616-recognize-when-one-quantity-changes-at-a-constant-rate-per-unit-interval-of-another

https://learnzillion.com/lessonsets/617-recognize-when-one-quantity-grows-or-decays-by-a-constant-percent-rate-per-unit-interval-of-another

http://quizlet.com/subject/linear-functions/

http://quizlet.com/subject/exponential-functions/

http://www.ixl.com/math/algebra-1 Linear functions: S.1; Functions: linear, quadratic, and exponential: all lessons

https://www.illustrativemathematics.org/content-standards/HSF/LE/A/1

https://www.youtube.com/watch?v=cvzzsUQHMpw&list=PLkZwAghwrSytqIJlef1yYtq7E51iKXVCY&index=30

http://www.mathworksheetsland.com/functions/25complineexpset.html

Functions

Interpret expressions for functions in terms of the situation they model.

Standard F.LE.5 [Also see 8.F.4] **Interpret the parameters in a linear or exponential function in terms of a context.**

Background knowledge needed

Understanding the difference between a linear and an exponential function

iPad resources

NONE

Print resources

1. Steck-Vaughn Mathematical Reasoning, Unit 3, Lessons 13, 15, 16, 17

2. Common Core Achieve, Lessons 6.2 and 6.3

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

Online resources

We recommend watching the YouTube video first.

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

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

www.quizlet.com (Enter search for *Interpreting functions in context*)

http://www.ixl.com/math/algebra-1 Relations and Functions: Q.11

https://www.illustrativemathematics.org/content-standards/HSF/LE/B/5

https://www.youtube.com/watch?v=aZbJUau4cD4&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY&index=1

Geometry: Congruence

Experiment with transformations in the plane.

Standard G.CO.1 **Know precise definitions of angle, circle, perpendicular lines, parallel lines, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.**

Background knowledge needed

Understanding of the concept of: (1) a point; (2) a line being straight and going to infinity in opposite directions; and (3) distance and measure, with distance always being a positive number

iPad resources

Maths app >> Geometry >> Chapter 1: Introduction >> Points, Lines, Planes, & Space; also, Segments, Rays, & Length; also, Segment Addition Postulate & Midpoint; also, Angles and Measure

Maths app >> Geometry >> Chapter 3: Parallel Lines & Polygons >> Intro to Parallel Lines

Maths app >> Geometry >> Chapter 2: Angle Pairs & Perpendicular Lines >> Perpendicular Lines

Print resources

1. Steck-Vaughn GED Mathematics (the red book), Lesson 24

2. Common Core Basics Mathematics, Lesson 12.1

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

Online resources

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

https://learnzillion.com/lessonsets/808-define-geometric-terms-precisely

http://quizlet.com/514661/basic-geometry-terms-flash-cards/

http://www.ixl.com/math/geometry Points, lines, and segments, B.1, B.2, B.3, B.4, B.7, B.8; also,
Angles: C.1; also, Circles, U.1 & U.3

https://www.illustrativemathematics.org/content-standards/HSG/CO/A/1

http://www.mathworksheetsland.com/geometry/1basicdefset.html

Geometry: Similarity, Right Triangles, and Trigonometry

Prove theorems involving similarity.

Standard G.SRT.5 [Also see 8.G.2 and 8.G.4] **Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.**

Background knowledge needed

Understanding how to solve proportions and equations

iPad resources

Maths app >> Geometry >> Chapter 4: Triangles >> Congruent Figures; also, Congruent Triangles – SSS, SAS, and ASA; also, Isosceles Triangle Theorem; also, Congruent Triangles – AAS & HL

Maths app >> Geometry >> Chapter 6: Similarity >> Similar Triangles – AA Similarity; Similar Triangles – Word Problems; also, Similar Triangles – SAS & SSS Similarity

MathPro!!! >> Grade 6 Math, Objective15: Congruence >> Chapters 1 – 3; also, Grade 7 Math, Objective 11: Similar vs. Congruent >> Chapters 1 - 3

Print resources

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

2. Steck-Vaughn GED Mathematics (the red book), pp. 302 – 305

Online resources

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

https://learnzillion.com/lessonsets/668-solve-problems-using-congruence-and-similarity-criteria-for-triangles

http://quizlet.com/30986118/triangles-similarity-statements-and-congruent-statements-flash-cards/

http://www.ixl.com/math/geometry Introduction to congruent figures: J.1, J.2, and J.3; also, Similarity: P.1, P.2, P.3, P.4, P.5, P.7, and P.8

https://www.illustrativemathematics.org/content-standards/HSG/SRT/B/5

http://www.mathworksheetsland.com/geometry/20congtrisssset.html

http://www.mathworksheetsland.com/geometry/21congtriaasset.html

Geometry: Geometric Measurement and Dimensions

Explain volume formulas and use them to solve problems.

Standard G.GMD.3 [Also see 7.G.6] **Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.**

Background knowledge needed

Understanding how to plug in given values into a formula and perform resulting calculations

Knowledge of the parts of three dimensional figures (base, height)

Knowledge of the use of π as 3.14 or 22/7

iPad resources

Maths app >> Geometry >> Chapter 10: Volume >> Volume of a Pyramid (parts 1 and 2); also, Volume of Cylinders & Cones; also, Volume of a Sphere

MathPro!!! >> Grade 7 Math, Objective 8: Surface Area and Volume >> Chapter 3 (cylinders); also, Grade 8 Math, Objective 7: Volume and Surface Area >> Chapters 4 – 7

Print resources

1. Steck-Vaughn GED Mathematics (the red book), pp. 278 – 281

2. Common Core Basics Mathematics, Lesson 12.7

3. Steck-Vaughn Mathematical Reasoning, Unit 4, Lessons 7, 8 and 9

4. Common Core Achieve Mathematics, Lessons 7.3 and 7.4

5. Kaplan Big Book: Geometry, Lesson 6

Workforce resources

1. McGraw-Hill Workforce Career Companions (all titles), pp. 82 - 83

Online resources

https://www.khanacademy.org/commoncore/grade-HSG-G-GMD#HSG-GMD.A.3

https://learnzillion.com/lessonsets/535-use-volume-formulas-for-cylinders-pyramids-cones-and-spheres-to-solve-problems

http://quizlet.com/11272306/volume-of-prisms-cylinders-pyramids-cones-and-spheres-flash-cards/

http://www.ixl.com/math/geometry Surface area and volume, T.1, T.4, T.5, and T.6

https://www.illustrativemathematics.org/content-standards/HSG/GMD/A/3

http://www.mathworksheetsland.com/geometry/44volofcylset.html

http://www.mathworksheetsland.com/geometry/45volconesset.html

Geometry: Modeling with Geometry

Apply geometric concepts in modeling situations.

Standard G.MG.2 [Also see 7.RP.3] **Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).**

Background knowledge needed

Understanding of the concepts of area, volume, and density

iPad resources

NONE

Print resources

NONE

Online resources

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

https://www.illustrativemathematics.org/content-standards/HSG/MG/A/2

http://www.mathworksheetsland.com/geometry/48usingdenset.html

http://betterlesson.com/common_core/browse/757/ccss-math-content-hsg-mg-a-2-apply-concepts-of-density-based-on-area-and-volume-in-modeling-situations-e-g-persons-per-square-mi

Statistics and Probability: Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurable variable.

Standard S.ID.1 [Also see 6.SP.4 and 8.SP.1] **Represent data with plots on the real number line (dot plots, histograms, and box plots).**

Background knowledge needed

Distinguishing between dot plots, histograms, and box plots.

iPad resources

Maths apps >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Pictographs and Line Plots; also, Histograms; also, Box-and-Whisker Plots

MathPro!!! >> Grade 7 Math, Objective 17: Statistics >> Chapters 1 – 2, 7 – 8, 13 – 14, & 19

Print resources

1. McDougal Littell Algebra 1, Lesson 6.7
2. Steck-Vaughn Mathematical Reasoning, Unit 2, Lesson 7
3. Common Core Achieve, Lesson 8.3
4. Kaplan Big Book: Data, Statistics, and Probability, Lesson 5

Online resources

https://www.khanacademy.org/commoncore/grade-HSS-S-ID#HSS-ID.A.1

https://learnzillion.com/lessonsets/751-represent-data-with-dot-plots-histograms-and-box-plots

http://quizlet.com/75316621/dot-plot-flash-cards/

http://quizlet.com/8010654/the-6-steps-to-make-a-box-and-whisker-plot-flash-cards/

http://quizlet.com/3588573/histograms-flash-cards/

http://www.ixl.com/math/grade-4 Data and graphs: J.2, J.6, J.7, and J.8

https://www.illustrativemathematics.org/content-standards/HSS/ID/B/5

https://www.youtube.com/watch?v=Wjnr0AZPMBU&index=19&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY (Math Dude video on creating a box-and-whisker plot)

http://www.mathworksheetsland.com/stats/1boxandwhiskersset.html

Statistics and Probability: Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurable variable.

Standard S.ID.3 [Also see 7.SP.4] **Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).**

Background knowledge needed

Understanding range of a data set and variation in a data set

Understanding the definition of "outlier"

iPad resources

Maths app >> Pre-Algebra >> Chapter 9: Probability and Statistics >> Range, Median, and Mode; also, Mean

MathPro!!! >> Grade 8 Math, Objective 12: Measures of Central Tendency (Mean, Median, and Mode) >> Chapters 1 - 6

Print resources

NONE

Online resources

https://www.khanacademy.org/commoncore/grade-HSS-S-ID#HSS-ID.A.3

https://learnzillion.com/lessonsets/753-interpret-differences-in-shape-center-and-spread-of-data-sets-in-context

http://quizlet.com/25465082/averages-and-spread-of-data-flash-cards/

http://www.ixl.com/math/grade-7 Data and graphs, O.2, O.5, O.8, and O.15

https://www.illustrativemathematics.org/content-standards/HSS/ID/A/3

https://www.youtube.com/watch?v=y_M5FZLb99w&index=18&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY

http://www.mathworksheetsland.com/stats/3outlinersset.html

Statistics and Probability: Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on two categorical and quantitative variables.

Standard S.ID.5 [Also see 8.SP.4] **Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.**

Background knowledge needed

Understanding how to create a two-way frequency table

Understanding the definitions of joint, marginal, and conditional relative frequencies (Suggested website with video that explains the definitions: http://study.com/academy/lesson/joint-marginal-conditional-frequencies-definitions-differences-examples.html)

iPad resources

NONE

Print resources

1. Steck-Vaughn GED Mathematics (the red book), Lesson 17

2. Common Core Achieve, Lesson 8.4 (the part about tables is loosely aligned with this standard)

3. Kaplan Big Book: Data, Statistics, and Probability, Lesson 1 (loosely aligned with this standard)

Online resources

https://www.khanacademy.org/commoncore/grade-HSS-S-ID#HSS-ID.B.5

https://learnzillion.com/lessonsets/469-summarize-categorical-data-for-two-categories-in-two-way-frequency-tables-interpret-relative-frequencies-and-recognize-trends

http://quizlet.com/45030752/digi-two-way-frequency-table-terminology-flash-cards/

http://www.ixl.com/math/grade-8 Data and graphs: N.12

https://www.illustrativemathematics.org/content-standards/HSS/ID/B/5

http://www.mathworksheetsland.com/stats/5twowaytablesset.html

Statistics and Probability: Interpreting Categorical and Quantitative Data

Interpret linear models.

Standard S.ID.7 [Also see 8.SP.3] **Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.**

Background knowledge needed

Understanding of slope as a rate of change in a linear function

iPad resources

Maths app >> Algebra 1 >> Chapter 5: Linear Equations >> Slope as a rate of change

MathPro!!! >> Grade 8 Math, Objective 16: Graphing Lines and Finding Slope >> Chapters 4 - 5

Print resources

1. McDougal Littell Algebra 1, Lesson 4.4

2. Steck-Vaughn Mathematical Reasoning, Unit 3, Lesson 17

3. Common Core Achieve, Lesson 5.1

4. Kaplan Big Book: Data, Statistics, and Probability, Lesson 2 (focus on line graphs)

Online resources

https://www.khanacademy.org/commoncore/grade-HSS-S-ID#HSS-ID.C.7

https://learnzillion.com/lessonsets/460-interpret-the-slope-and-intercept-of-a-linear-function-in-context

http://quizlet.com/61462988/3-1-slope-as-a-rate-of-change-flash-cards/

http://www.ixl.com/math/algebra-1 Functions: linear, quadratic, exponential, CC.4

http://www.ixl.com/math/grade-8 Data and graphs: N.4

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

https://www.youtube.com/watch?v=z1-uYS6hsHQ&list=PLkZwAghwrSytqlJlef1yYtq7E51iKXVCY&index=9

http://www.mathworksheetsland.com/stats/9interslopeset.html

Statistics and Probability: Interpreting Categorical and Quantitative Data

Interpret linear models.

Standard S.ID.9 **Distinguish between correlation and causation.**

Background knowledge needed

Understanding false reasoning

Example: As ice cream sales increase, the rate of drowning deaths increases sharply.

This example fails to recognize the importance of time and temperature in relationship to ice cream sales. Ice cream sales are greater in the summer months, which is also the time period in which more people participate in water activities. The increase in drowning deaths is caused by the increase in water activities, not by the increase of ice cream sales.

iPad resources

Maths apps >> Algebra 1 >> Additional NCTM Concepts >> Dependency & Correlational Relationships >> Correlational Relationships

Print resources

1. Common Core Basics Mathematics, Lesson 6.4

Online resources

https://www.khanacademy.org/commoncore/grade-HSS-S-ID#HSS-ID.C.9

https://learnzillion.com/lessonsets/585-distinguish-between-correlation-and-causation

http://quizlet.com/14143991/correlation-and-causation-flash-cards/

http://www.ixl.com/math/algebra-1 Data and graphs: N.6

https://www.illustrativemathematics.org/content-standards/HSS/ID/C/9

http://www.mathworksheetsland.com/stats/10corrvscauseset.html