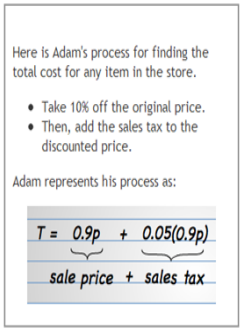
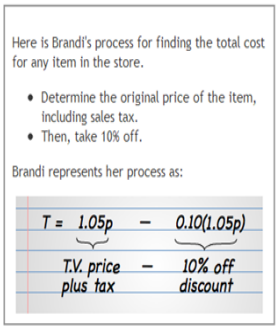
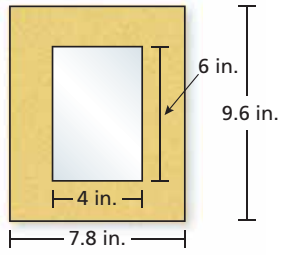
24	Represent and solve two-step equations		1) Consider the equation below: $3(4v + 1) - 3(2v + 3) = 2(v - 7) + w$ Identify two expressions that are equivalent to w from the shaded box below. Write them in the two boxes in the equation. $w =$ ☐ $=$ ☐ $4v + 8$ $\quad -v + 9$ $\quad 8v - 20$ $\quad 6(v - 1)$ $\quad -1(v - 9)$ $4v - 28$ $\quad 6v - 6$ $\quad 4(v + 2)$ $\quad 4(v - 7)$ $\quad 4(2v - 5)$ 2) Choose one of the expressions from the box to fill in the blank in each of the equations below to form three true statements. -4 ☐ $= -4x + 16$ $\frac{3}{4}$ ☐ $= -3 + 3x$ -0.113 ☐ $= 0.452x + 0.452$ $(x - 4)$ $\quad (x + 4)$ $\quad (-x + 4)$ $\quad (4 - 4x)$ $(-4 + 4x)$ $\quad (-4x - 4x)$ $\quad (4x + 4)$ $\quad (-4x - 4)$	"Learning Task: Geology Rocks Equations" (Appendix C)
25	**Flex Day (Instruction Based on Data)** **Recommended Resources:** My Math Chapter 6 Problem-Solving Investigation (Pages 489 – 492) "Building Equations" (Appendix C)			

26	Build an algebraic expression using the context of a word problem and use that expression to write an equation that can be used to solve the word problem.	• Opening Problem/Hook: Half of your baseball card collection got wet and was ruined. You bought 11 cards to replace some that were lost. How many did you begin with if you now have 24? Explain your answer.	*1)* A wise man once said, "500 reduced by 4 times my age is 232." What is his age? Write an equation to represent and solve the problem. *2)* Ashley won 40 lollipops playing hoops at her school's game night. Later, she gave two to each of her friends. She only has 4 remaining. How many friends does she have? Write an equation to represent and solve the problem.	Engage NY Module 3 Lesson 7 (Appendix C) Learnzillion - Write An Algebraic Equation From a Real World Scenaior Using Multiplication and Division
27 - 28	Apply the addition, subtraction, multiplication, division, and substitution properties of equality to 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.	• Pacing: 2 days • students must understand that any equation with rational coefficients can be written as an equation with expressions that involve only integer coefficients by multiplying both sides by the least common multiple of all the rational number terms • understand that any equation can be rewritten to an equivalent equation with expressions that involve only integer coefficients by multiplying both sides by the correct number.	1) A young boy is growing at a rate of 3.5 cm per month. He is currently 90 cm tall. At that rate, in how many months will the boy grow to a height of 132 cm? Let me represent the projected height of 132 cm. Solve the following equation: $3.5m + 90 = 132$ 2) The sum of a number, $\frac{1}{6}$ of that number, $2\frac{1}{2}$ of that number, and 7 is $\frac{1}{2}$. Find the number. Solve the following equation: $n+\frac{1}{6}n+(2\frac{1}{2})n+7=12\frac{1}{2}$ *3)* The floor of a canyon has an elevation of -14.5 ft. Erosion causes the elevation to change by -1.5 feet per year. How many years will it take for the canyon floor to have an elevation of -31 feet?	Engage NY Module 3 Lessons 8-9 (Appendix C)

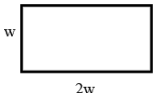
29 - 30	Make sense of and persevere in solving multi-step real world problems	• Pacing: 2 days Lesson/Practice Examples: 1) When working on a report for class, Catrina read that a woman of the age of 40 can lose approximately 0.06 centimeters of height per year. (a) Catrina's aunt Nancy is 40 years old and 5 feet 7 inches tall. Assuming her height decreases at this rate after the age of 40, about how tall will she be at age 65? Explain your reasoning. *(Remember that 1 inch = 2.54 centimeters.)* (b) Catrina's 90-year-old grandmother is 5 feet 1 inch tall. Assuming her grandmother's height has also decreased at this rate, about how tall was she at age 40? Write equations to solve and explain your thinking 2) On an algebra test, the highest grade was 42 points higher than the lowest grade. The sum of the two grades was 138. Find the lowest grade. Write an equation to represent the problem.	1) A store is advertising a sale with 10% off all items in the store. Sales tax 5%. Adam and Brandi are customers discussing how the discount and tax will be calculated.   In both equations, T represents the total cost of a television, and p represents the regular price. Are they both correct? Use the properties of operations to justify your answer. 2) The mat below needs to be cut to have a 0.5-inch border on all four sides. a. How much should you cut from the left and right sides? b. How much should you cut from the top and bottom? 	"Deconstructing Word Problems" (Appendix C) http://learnzillion.com/lessons/3203 http://www.virtualnerd.com/common-core/grade-7/7_EE-expressions-equations/B/3 http://learnzillion.com/lessonsets/135-solve-multistep-reallife-and-mathematical-problems-with-positive-and-negative-rational-numbers-in-any-form http://www.opusmath.com/common-core-standards/7.ee.3-solve-multi-step-real-life-and-mathematical-problems-posed-with-positive

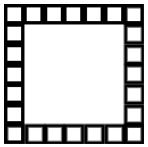
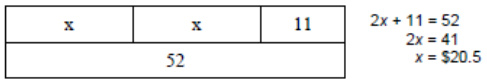
31	**Flex Day (Instruction Based on Data)** **Recommended Resources:** "Steps to Solving Equations" (Appendix C) "Population Equations" (Appendix C)			
32	Solve for missing angle measurements using equations	• Use the My Math resource only for remediation/re-teach; center your lesson around the Engage NY resource	Engage NY Exit Ticket	Engage NY Module 3 Lesson 10 (Appendix C) My Math Chapter 7 Lesson 1
33	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.	• Use the My Math resource only for remediation/re-teach; center your lesson around the Engage NY resource	Engage NY Exit Ticket	Engage NY Module 3 Lesson 11 (Appendix C) My Math Chapter 7 Lesson 2
34	Observe patterns when manipulating values on either side of an inequality sign to determine values that satisfy a given inequality	• Review the prefix in the word inequality as "in" means "not" so students understand inequality means "not equal" • Understand that inequalities are used to model real world or mathematical problems when trying to find the values of two expressions that are not equal and may take the form of $px + > r$ and/or $p(x + q) < r$, where p, q, and r are rational numbers. •	Engage NY Exit Ticket	Engage NY Module 3 Lesson 12 (Appendix C)
35	**Flex Day (Instruction Based on Data)** **Recommended Resources:** My Math Chapter 7 Lesson 3 "I Have a Secret Angle" (Appendix C) "Learning Task: Food Pyramid, Square, Circle" (Appendix C)			

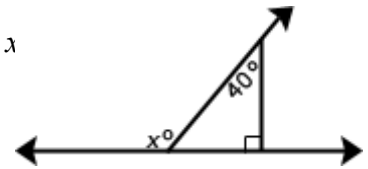
36	Solve one-step inequalities and graph solution sets on a number line	• Determine and explain the similarities and differences between inequalities and equations • Combine resources by selecting various problems from each lesson	Solve the following inequalities and graph each solution set on a number line: 1) 1) $v - \frac{3}{4} < 0$ 2) $\frac{3}{2} < p + \frac{1}{2}$	My Math Chapter 6 Lessons 6-7
37	Solve two-step inequalities and graph solution sets on a number line		Solve the following inequalities and graph each solution set on a number line: 1) $2m + 1 \geq 7$ 2) $\frac{5}{4} > -3w - \frac{7}{4}$ 3) 3) $2 - \frac{j}{5} > 7$	My Math Chapter 6 Lesson 8
38	Write and evaluate inequalities		1) In many states, you must be at least 14 years old to operate a personal watercraft. Write an inequality that represents this situation. 2) Your iPod can store up to 8 gigabytes of media. You transfer 3.5 gigabytes of media to the iPod. Write an inequality that represents the amount of memory available on the iPod. 3)) You buy lunch for guests at a party. You can spend no more than $100. You will spend $20 on beverages and $10 per guest on sandwiches. Write an inequality to find the number of guests you can invite to the party.	Engage NY Module 3 Lesson 13 (Appendix C)

39	Make sense of and persevere in solving multi-step real world problems involving inequalities		1) Brenda has $500 in her bank account. Every week she withdraws $40 for miscellaneous expenses. How many weeks can she withdraw the money if she wants to maintain a balance of at least $200? Explain your answer.	Engage NY Module 3 Lesson 14 (Appendix C)
40	Graph solutions to multi-step real world problems involving inequalities		1) Three requirements for a lifeguard training course are shown below.  Write and graph three inequalities that represent the requirements. 2) You have a gift card worth $50. You want to buy several paperback books that cost $6 each. Write and solve an inequality to find the number of books you can buy and still have at least $20 left on the gift card. Graph the solution	Engage NY Module 3 Lesson 15 (Appendix C)
41	**Flex Day (Instruction Based on Data)** **Recommended Resources:** My Math Chapter 6 21st Century Careers (Pages 521 – 522) My Math Chapter 6 Review (Pages 523 – 526) "TV Time and Video Games" (Appendix C) "Toy Trains" (Appendix C) http://www.mathsisfun.com/algebra/inequality-solving.html			
42	**MCLASS Beacon 7.3 End of Unit Assessment** ***Appendix B*** **Note: this assessment will be administered online*			

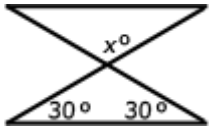
Appendix A:
Unpacked Standards Guide
Source: Public Schools of North Carolina NCDPI Collaborative Workspace

Standard	**Unpacking** *What do these standards mean a child will know and be able to do?*
7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	**7.EE.1.** Examples: • Write an equivalent expression for $3(x + 5) – 2$ • Suzanne thinks the two expressions $2(3a – 2)$ and $10a – 2$ are equivalent? Is she correct? Explain why or why not? • Write equivalent expressions for $3a + 12$. Possible solutions might include factoring as in $3(a + 4)$, or other expressions such as $a + 2a + 7 + 5$. • A rectangle is twice as long as wide. One way to write an expression to find the perimeter would be $w + w + 2w$. Write the expression in two other ways. Solution: 6w OR $2(w) + 2(2w)$  • An equilateral triangle has a perimeter of $6x + 15$. What is the length of each of the sides of the triangle? Solution: $2(2x + 5)$, therefore each side is $2x + 5$ units long.
7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, $a + 0.05a = 1.05a$ means that "increase by 5 percent" is the same as "multiply by 1.05."*	**7.EE.2.** Examples: • Jamie and Ted both get paid an equal hourly wage of $9 per hour. This week, Ted made an additional $27 dollars in overtime. Write an expression that represents the weekly wages of both if J = the number of hours that Jamie worked this week and T = the number of hours Ted worked this week? Can you write the expression in another way? Students may create several different expressions depending upon how they group the quantities in the problem. One student might say: To find the total wage, I would first multiply the number of hours Jamie worked by 9. Then I would multiply the number of hours Ted worked by 9. I would add these two values with the $27 overtime to find the total wages for the week. The student would write the expression $9J + 9T + 27$. Another student might say: To find the total wages, I would add the number of hours that Ted and Jamie worked. I would multiply the total number of hours worked by 9. I would then add the overtime to that value to get the total wages for the week. The student would write the expression $9(J + T) + 27$ A third student might say: To find the total wages, I would need to figure out how much Jamie made and add that to how much Ted made for the week. To figure out Jamie's wages, I would multiply the number of hours she worked by 9. To figure out Ted's wages, I would multiply the number of hours he worked by 9 and then add the $27 he earned in overtime. My final step would be

	to add Jamie and Ted wages for the week to find their combined total wages. The student would write the expression (9*J*) + (9*T* + 27). • Given a square pool as shown in the picture, write four different expressions to find the total number of tiles in the border. Explain how each of the expressions relates to the diagram and demonstrate that the expressions are equivalent. Which expression do you think is most useful? Explain your thinking. 
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 10percent raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	**7.EE.3.** Estimation strategies for calculations with fractions and decimals extend from students' work with whole number operations. Estimation strategies include, but are not limited to: • front-end estimation with adjusting (using the highest place value and estimating from the front end making adjustments to the estimate by taking into account the remaining amounts), • clustering around an average (when the values are close together an average value is selected and multiplied by the number of values to determine an estimate), • rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding affected the original values), • using friendly or compatible numbers such as factors (students seek to fit numbers together - i.e., rounding to factors and grouping numbers together that have round sums like 100 or 1000), and • using benchmark numbers that are easy to compute (students select close whole numbers for fractions or decimals to determine an estimate). Example: • The youth group is going on a trip to the state fair. The trip costs $52. Included in that price is $11 for a concert ticket and the cost of 2 passes, one for the rides and one for the game booths. Each of the passes cost the same price. Write an equation representing the cost of the trip and determine the price of one pass.  $2x + 11 = 52$ $2x = 41$ $x = \$20.5$

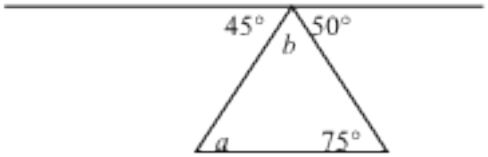
7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, *and* r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* b. Solve word problems leading to equations of the form $px + q > r$ *or* $px + q < r$, where p, q, *and* r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make and describe the solutions.*	**7.EE.4** Examples: • Amie had $26 dollars to spend on school supplies. After buying 10 pens, she had $14.30 left. How much did each pen cost? • The sum of three consecutive even numbers is 48. What is the smallest of these numbers? • Solve: $\frac{5}{4}n + 5 = 20$ • Florencia has at most $60 to spend on clothes. She wants to buy a pair of jeans for $22 dollars and spend the rest on t-shirts. Each t-shirt costs $8. Write an inequality for the number of t-shirts she can purchase. • Steven has $25 dollars. He spent $10.81, including tax, to buy a new DVD. He needs to set aside $10.00 to pay for his lunch next week. If peanuts cost $0.38 per package including tax, what is the maximum number of packages that Steven can buy? Write an equation or inequality to model the situation. Explain how you determined whether to write an equation or inequality and the properties of the real number system that you used to find a solution. • Solve $\frac{1}{2}x + 3 > 2$ and graph your solution on a number line.
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.	**7.G.5** Students use understandings of angles and deductive reasoning to write and solve equations <u>Example1:</u> Write and solve an equation to find the measure of angle x  *Solution:* Find the measure of the missing angle inside the triangle (180 – 90 – 40), or 50°. The measure of angle x is supplementary to 50°, so subtract 50 from 180 to get a measure of 130° for x.

Example 2:
Find the measure of angle *x*.



Solution:
First, find the missing angle measure of the bottom triangle (180 – 30 – 30 = 120). Since the 120 is a vertical angle to *x*, the measure of *x* is also 120°.

Example 3:
Find the measure of angle *b*.



Note: Not drawn to scale.

Solution:
Because, the 45°, 50° angles and *b* form are supplementary angles, the measure of angle *b* would be 85°. The measures of the angles of a triangle equal 180° so 75° + 85°+ *a* = 180°. The measure of angle *a* would be 20°.