Utah Math

Chapter 1: Section 1
Creating and Solving Multi-Step Linear Equations

Standards:

- Solve linear equations in one variable. (8.EE.7)
  a) Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a, a = a,$ or $a = b$ results (where a and b are different numbers).
  b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Academic Vocabulary: linear expression, simplify, evaluate, linear equation, equivalent expression, solve, solution, inverse operations, like terms, distributive property, ratio, no solution, infinitely many solutions

Chapter 1 Section 1 Interactive Notebook Index

Chapter 1.1 Vocabulary Glossary

Vocabulary words will be ***bold, underlined, and in italics*** within the text of this chapter. As you see these words, add the definition to this page by creating at text box.

Distributive Property

Equivalent Expressions

Evaluate

Inverse Operations

Like Terms

Linear Equations

Linear Expressions

Simplify

Solution

Solve

Chapter 1 Anchor Problem

Directions: Consider the following situations. Then answer the questions below. Include any pictures, models, or equations you used to solve the problem and clearly explain the strategy you used.

Situation 1: Two students, Theo and Lance, each have some chocolates. They know that they have the same number of chocolates. Theo has four full bags of chocolates and five loose chocolates. Lance has two full bags of chocolates and twenty-nine loose chocolates.

Determine the number of chocolates in a bag. Determine the number of chocolates each child has.

Situation 2: Two students, Arthur and Oliver, each have some chocolates. They know that they have the same number of chocolates. Arthur has two tubs of chocolates, one bag of chocolates, and twenty-five loose chocolates. Oliver has two tubs of chocolates, two bags of chocolates, and seven loose chocolates.

Determine the number of chocolates in a tub. Determine the number of chocolates in a bag.

Situation 3: Two students, Abby and Amy have the same number of chocolates. Abby has one full tub of chocolates and 21 remaining chocolates. Amy has one full tub of chocolates and 17 remaining chocolates.

Determine the number of chocolates in a tub.

Lesson 1.1a

Watch and Listen to this video to help you with 1.1a (1-5).

1. Emma is playing a popular video game and is determined to beat the high score. The game saves her place so that each time she plays it again, she picks up in the same place with the same number of points. Emma downloads the video game on Monday night and starts playing, scoring a bunch of points. On Tuesday, she scores an additional 500 points. On Wednesday she doubles her score from the previous day. On Thursday, she scores the same number of points that she scored on Monday.

1.1a (1-5).mp4

a. Miguel's teacher asks him to write a ***linear expression*** that represents Emma's total score after she is done playing on Thursday.

Miguel writes the following expression: $2(p + 500) + p$

Miguel's teacher lets him know that his expression is correct. Write in words what each piece of Miguel's expression represents in the story problem.

p-

p + 500-

2(p + 500)-

2(p + 500) + p-

b. Nevaeh writes the following expression to represent Emma's score on Thursday. $2p + 1000 + p$

The teacher lets her know that she is also correct. How did Nevaeh represent the problem differently than Miguel?

c. Can you think of another expression to represent Emma's score on Thursday?

If Emma scored 700 points on Monday, ***evaluate*** each of the three expressions below to determine how many points Emma has on Thursday.

Miguel's expression:

2(p + 500) + p	sub 700 for each p variable
2(700 + 500) + 700	add numbers in the parentheses
2(1200) + 700	distribute the 2 (multiply)
2400 + 700	add the like terms
3100	This is your answer

Nevaeh's expression:

Your Expression:

Lesson 1.1a cont. Online Link for Algebra Tiles

Miguel, Nevaeh, and you all wrote linear expressions to represent Emma's total number of points on Thursday. A ***linear expression*** is a mathematical phrase consisting of numbers, unknowns (symbols that represent numbers), and arithmetic operations. Linear expressions describe mathematical or real-world situations.

The following are all examples of linear expressions:

- $3x - 5$
- $2x - x - 17$
- $3x$
- $6(2x - 5) + 11$
- $3x + 7x - 3 + 2x$
- 25

Below are ***equivalent expressions*** that represent Emma's score from the video game example. Substituting in a specific number for the unknown in an expression and calculating the resulting value is the process to ***evaluate*** the expression.

- $2(p + 500) + p$
- $2p + 1000 + p$
- $3p + 1000$

For ease of communicating mathematical ideas, we will consider a ***linear expression*** in the form $\boldsymbol{Ax + B}$ where A and B are numbers and x represents an unknown, the **simplified form of a linear expression**. From the three examples above, the simplified form of the expression is

$$3p + 1000.$$

In this lesson, we will be using tiles to model and ***simplify*** linear expressions.

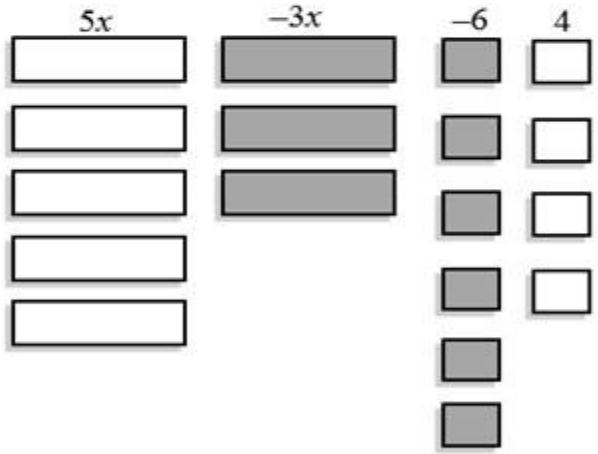
Key for Tiles:

Remember that a positive tile and a negative tile can be combined to create a **zero pair** or add to zero.

2. The following is a model of the expression

$\boldsymbol{5x + (-3x) - 6 + 4}$

a. Using your line tool, cross out zero pairs and write the simplified form of this expression below (insert text box).



b. Evaluate this expression from above when $x = 8$. Insert a photo of your work below.

INSERT IMAGE HERE

Lesson 1.1a cont.

3. On your paper, model the expression $-4x + 3 + 5x + (-1)$

by drawing tiles and inserting your photo of the model here..

INSERT IMAGE HERE

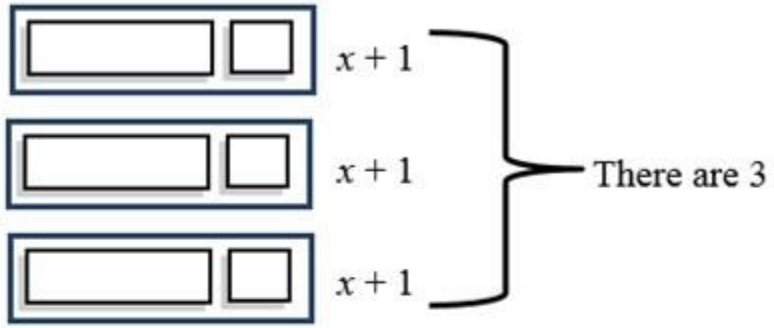
a. Find zero pairs, cross them out, and write the simplified form of this expression. Insert your photo here.

INSERT IMAGE HERE

b. Evaluate this expression when $x = -5$. Insert your photo here.

INSERT IMAGE HERE

4. The following is a model of the expression $3(x + 1)$.



a. Write the simplified form of this expression. Insert your answer in a text box below.

b. Evaluate this expression when $x = -4$. Insert your photo below.

INSERT IMAGE HERE

Lesson 1.1a cont.

5. Use this expression to answer a – c. $2(2x - 1)$.

a. Model the expression using algebra tiles.

b. Write the simplified form of this expression.

c. Evaluate this expression when $x = 0$.

Insert your photo below.

INSERT IMAGE HERE

On your own paper, model the expressions below using algebra tiles and simplify each expression. Insert the photo of your work for 6-11 on the following slide.

6) $2(x + 2) - x$

7) $3 - 3x + 4(x - 3)$

8) $-4x + 3 + 5(2x - 1)$

9) $12 - (x - 2) + 4x$

10) $6x + 12$

11) $4x - 2$

Lesson 1.1a cont.

Insert the photo of your work for 6-11 here.

INSERT IMAGE HERE

Lesson 1.1a cont.

12. A group of friends goes to a movie on Friday night. Each friend purchases a movie ticket that costs $8, a small popcorn that costs $3.50, and a medium drink that costs $2.25.

Part A) Using your line tool, cross out the expression(s) below that do **NOT** represent the **total amount of money spent** by the group if f represents the number of friends that went to the movie. There are <u>three</u> answers that will model this real-world example.

a) $8 + 3.50 + 2.25$

b) $f(8 + 3.50 + 2.25)$

c) $f + 8 + 3.50 + 225$

d) $f + 13.75$

e) $8f + 3.5f + 2.25f$

f) $13.75f$

Part B) If 8 friends go to the movie, how much money will **each person** spend? How much money will the **entire group** spend?

Work out your answers on a separate sheet of paper and insert the picture of your work below.

INSERT IMAGE HERE

Check your answers for 1.1a (7-10) here.

Lesson 1.1a cont.

Helpful IXL Lessons...

IXL – 7th Grade>R.17 Identify equivalent linear expressions using algebra tiles Link

IXL – 7th Grade>R.4 Evaluate linear expressions Link

IXL – 7th Grade>R.18 Identify equivalent linear expressions I Link

IXL – 7th Grade>R.20 Identify equivalent linear expressions: word problems Link

Assistments Homework Problems

PSA56TH - 1.1a Homework: Simplifying Linear Expressions (7.NS.2d, 7.NS.3, 7.SP.5, 7.SP.6, 7.EE.3) Link

HELPFUL Khan Academy LINKS

Equivalent expressions

Equivalent Linear Expressions

Linear Equation Word Problems

Lesson 1.1b

Lesson 1.1b Video

1. Aria and her friends are playing a game. The expressions below represent the amount of money each player has at the end of the game where m is the amount of money a player started with. Match each player's scenario with the correct expression below and record your answers on the following slide.

a. $2(3m - 100)$	b. $\frac{m}{2} + 100 - 25$	c. $2m - 100 - 25$
d. $\frac{(m+100)}{2} - 25$	e. $2(m - 100) - 25$	f. $2(\frac{m}{3} - 100)$
Lea collects the following cards: Your house was damaged in a flood. Pay half of your remaining money for repairs. Congratulations! Your art submission won first place. Collect $100. You got a parking ticket. Pay $25.	Aria collects the following cards: It's time to pay property taxes. Pay the bank $100. You are doing a great job at work and just received a bonus. Double the amount of money you currently have. It's the first day of school. Pay the school $25 for supplies.	Peta collects the following cards: You are doing a great job at work and just received a bonus. Double the amount of money you currently have. It's time to pay property taxes. Pay the bank $100. It's the first day of school. Pay the store $25 for school supplies.
Miya collects the following cards: Congratulations! Your art submission won first place. Collect $100. Your house was damaged in a flood. Pay half of your remaining money for repairs. You got a parking ticket. Pay $25.	Hadley collects the following: You won the lottery! Triple the amount of money your currently have. It's time to pay property taxes. Pay the bank $100. You are doing a great job at work and just received a bonus. Double the amount of money you currently have.	Sierra collects the following cards: Your two sisters want to join the game. Divide your current amount of money among the three of you. It's time to pay property taxes. Pay the bank $100. You are doing a great job at work and just received a bonus. Double the amount of money you currently have.

Lesson 1.1b cont.

Using the line tool, match each name to the correct expression.

Lea	a. $2(3\mathrm{m} - 100)$
Aria	b. $\frac{\mathrm{m}}{2} + 100 - 25$
Peta	c. $2m - 100 - 25$
Miya	d. $\frac{(m+100)}{2} - 25$
Hadley	e. $2(m - 100) - 25$
Sierra	f. $2(\frac{m}{3} - 100)$

If each player started the game with $1000, who won the game? (Hint: evaluate each expression by substituting 1000 for the variable m. Insert a photo of that work in the space on the right of your slide.) Using a text box, type the name of the winner of the game below.

WINNER:

Insert a photo of your work below.

INSERT IMAGE HERE

Lesson 1.1b cont.

2. Tim took his friends to the movies. He started with $40 and bought 3 movie tickets that each cost *x* dollars. He also bought one tub of popcorn that cost $5.75.

Using your line tool, cross out the expression(s) that would not represent the amount of money Tim has left?

$40 - x - x - x - 5.75$ $40 - 3x - 5.75$

$40 - 3 - 5.75$ $-3x + 34.25$

$34.25 - 3x$ $31.25x$

If each movie ticket costs $6, how much money does Tim have left? Insert a photo of your work below.

INSERT IMAGE HERE

3. Master Tickets charges $35 for each concert ticket, plus an additional $2 service fee for each ticket purchased. Kanye purchased *x* concert tickets.

Using your line tool, cross out the expression(s) that do not represent the amount of money Kanye spent?

35x + 2 *37x*

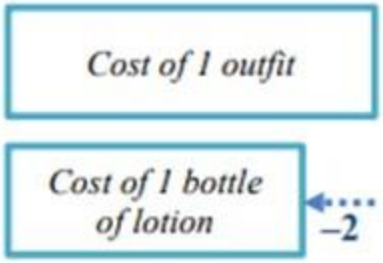
35x + 2x *x(35 + 2)*

If Kanye purchased 4 concert tickets, how much did he spend? Insert a photo of your work below.

INSERT IMAGE HERE

Lesson 1.1b cont.

4. Sara bought 3 baby outfits that cost p dollars each and one bottle of baby lotion. The baby lotion costs 2 dollars less than an outfit. The following is a model of this situation.



Which of the following expression(s) represent(s) the amount of money Sara spent? Cross out the expressions that are incorrect with your line tool.

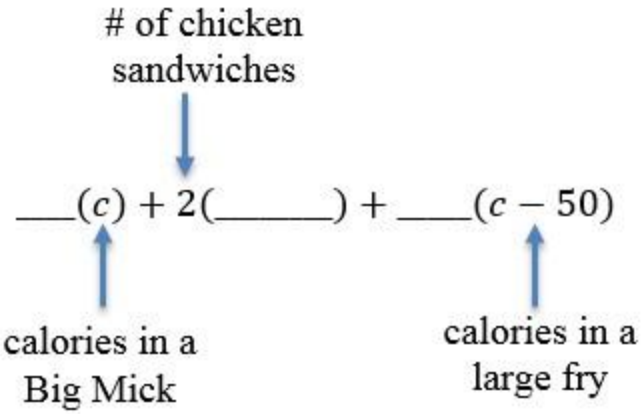
$p + p + p - 2$	$3p + (p - 2)$
$p + p + p + (p - 2)$	$4p - 2$
$3p - 2$	$2p$

If each baby outfit costs $5, how much did Sara spend? Insert a photo of your work below.

INSERT IMAGE HERE

5. Antony and his friends went to a fast food restaurant for lunch. They ordered and ate 3 Big Micks, 2 Mick-Chicken Sandwiches, and 4 large fries. A Mick-Chicken Sandwich has 200 fewer calories than a Big Mick. A large fry has 50 fewer calories than a Big Mick.

Part of an expression that represents the total number of calories consumed by Antony and his friends is shown below. Fill in the remaining pieces of the expression, and simplify the expression.



Type the simplified form of the expression below by inserting a text box.

If a Big Mick has 550 calories in it, how many calories did Antony and his friends consume? Insert a text box below and type your answer.

Lesson 1.1b cont.

Helpful IXL Lessons...

IXL – 8th Grade>V.4 Write variable expressions: word problems MEC Link

Assistments Homework Problems

PSA566S - 1.1b Homework: Writing Linear Expressions to Model Real World Situations (7.NS.2d, 7.NS.3, 7.SP.5, 7.SP.6, 7.EE.3) Link

Khan Academy Useful Links

Writing Variable expressions from word Problems

Lesson 1.1c

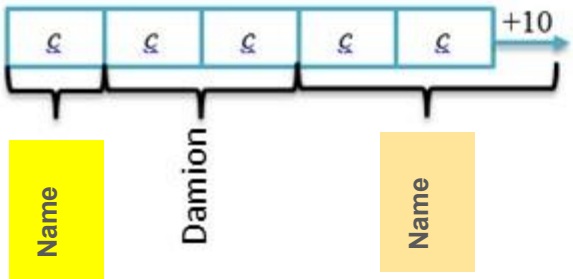
Lesson 1.1c Video

In the lessons up to this point, we have been working with linear expressions. We reviewed how to **simplify** a linear expression and how to **evaluate** a linear expression for a given value of x. We will now begin our work with linear equations. When we ***solve*** a linear equation, our task is to find the values of the unknown that make the equation true.

What is the difference between an expression and an equation? (Insert a text box and answer the questions in your own words.)

1. Damion and his friends went trick-or-treating. The next day, they got together and counted their candy. Damion had twice as much candy as Nick. Bo had 10 more pieces than Damion.

The following model and expression represent the amount of candy the boys have together:

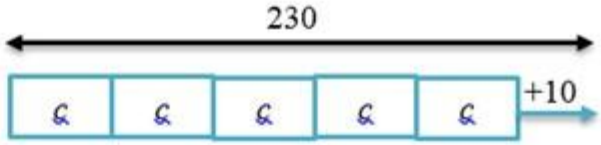


$c + 2c + (2c + 10)$

Name Damion Name

By inserting text boxes, show on the model and the expression which pieces represent the amount of candy each of the boys has. The first one has been done for you.

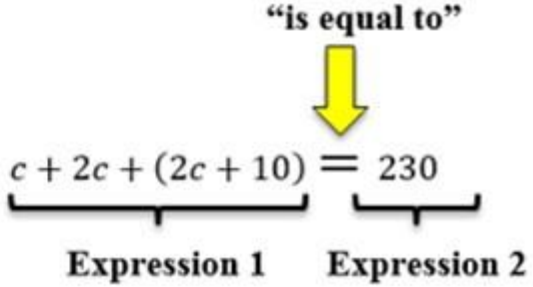
What if we also knew that together the boys have 230 pieces of candy? Let's look at a model for this:



$c + 2c + (2c + 10)$ and 230 are both linear expressions that represent the amount of candy the boys have together. When we set two linear expressions equal to each other, we create a linear equation. A ***linear equation*** is an assertion or statement that two linear expressions are equal to each other.

Using the candy example, we can create the following equation:

a. Model this equation with your tiles and solve for c.
b. What does c represent in the context?
c. How many pieces of candy do each of the boys have?



(Insert a photo of your work below.)

INSERT IMAGE HERE

Lesson 1.1c cont.

When we ***solve*** a linear equation, our task is to find the values of the unknown that make the equation true.

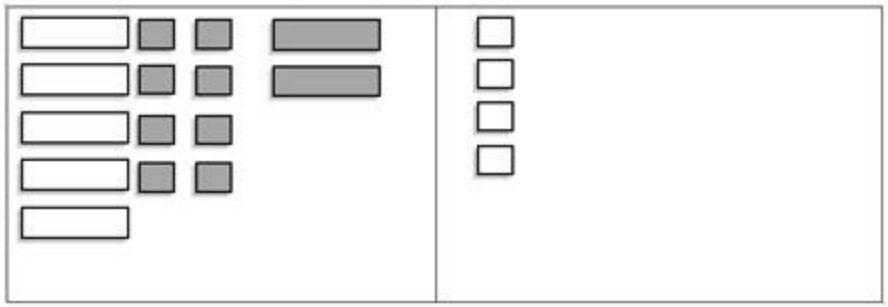
A ***solution*** to an equation is a number that makes the equation true when substituted for the unknown.

It is important to note that when we create an equation, the two expressions on either side of the equal sign might be true for

1) **one value of *x*** (as we saw in the candy example above),
2) **no values of *x*** (there is not a number that can be substituted for the variable to make the equation true), or
3) **all values of *x*** (every number we substitute in for the variable will make the equation true).

In the first section, we will study equations that have one solution.

2. The following is a model of the equation $5x - 8 - 2x = 4$. Create this model on your paper.



a. Solve the equation, showing the solving actions (steps).

b. Verify the solution. (Insert a photo of your work)

(Insert a photo of your work from #2 here)

INSERT IMAGE HERE

Complete the following problems and insert a photo of your work on the next page.

3) $4x+3x-1=6$

4) $10=-x+3x+4$

5) $2x-x+4=-8$

6) $10=-2x-3+4x+5$

Lesson 1.1c cont.

(Insert a photo of your work from #3-6 here)

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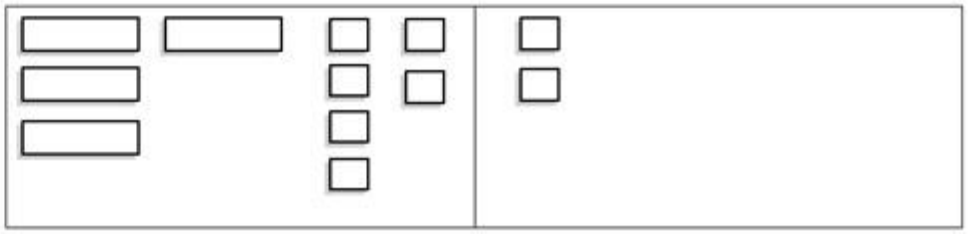
7. The following is a model of an equation. Solve the equation, showing the solving actions (steps).



a. Write the equation for this model. (Insert a text box with your answer)

b. Solve the equation. (Insert a photo of your work below)

INSERT IMAGE HERE

Lesson 1.1c cont.

8) $-7x + 5x + 3 = -9$

9) $17 = m + 5 - 3m$

10) $0.5b + 2b = -50$

11) $-\frac{2}{3} = -\frac{4}{3} + 6r$

(Insert a photo of your work from #8-11 here)

12. Ricardo solved the following equation incorrectly.

$2x + x + 5x = 56$	
$7x = 56$	Combine like terms.
$x = 8$	Divide both sides by 7.

Find the mistake and describe the mistake in words. Then, solve the equation correctly. (Insert a photo of your work below.)

Lesson 1.1c cont.

13. Carson and his family drove to Disneyland. They started driving on Thursday and then stopped for the night. On Friday, they drove twice as many miles as they had on Thursday. On Saturday, they drove fifty miles more than they had on Friday. Carson's mom asked him to write an equation to determine how many miles they drove each day.

Carson wrote the following equation: $m + 2m + (2m + 50) = 650$

a. Using your line tool, match each expression with the statement it represents in the story.

m	The number of miles driven on Friday
$2m$	The number of miles driven on Saturday
$(2m + 50)$	The total number of miles driven.
$m + 2m + (2m + 50)$	The number of miles driven on Thursday.

b. If Carson and his family live 650 miles from Disneyland, how many miles did Carson's family drive each day?
(Insert the photo of your work below)

Lesson 1.1c cont.

14. George started writing a story that matches the expressions and equation shown on the left. Pieces of the story are missing. Help him finish the story, solve the equation, and determine each person's age.

Ages
Talen's age: t
Peter's age: $8t + 3$
$t + (8t + 3) = 39$

(Insert Text boxes to finish the story below)

Story

I am trying to figure out Peter and Talen's ages. Peter tells me that he is three more than...

Together, Talen and Peter's ages...

How old are Talen and Peter?

Solve the equation for t to find out Talen's age.
(Insert a photo of your work below)

Plug in the value you found for t into Peter's expression.
(Insert a photo of your work below)

Lesson 1.1c cont.

Helpful IXL Lessons…

IXL – 8th Grade>W.9 Solve multi-step equations 55K Link
IXL – 8th Grade>W.11 Solve equations with variables on both sides ZYL Link
IXL – Algebra 1>J.6 Solve equations with variables on both sides 7S7 Link
IXL – Algebra 1>J.10 Solve linear equations: word problems UFG Link

Assistments Homework Problems

PSA5677 - 1.1c Homework: Solving Multi-Step Linear Equations (combine like terms) (7.NS.2d, 7.NS.3, 7.SP.5, 7.SP.6, 7.EE.3) Link

HELPFUL Khan Academy Lessons……

Multi Step Equation Review

Equations with variables on both sides

Linear Equations Word problems

Lesson 1.1d

1.1d Equations with Fractions.webmo

1. Use the following equations to answer the questions that follow.

$$\frac{x+3}{2}=5 \qquad \frac{x}{2}+3=5 \qquad \frac{1}{2}(x+3)=5 \qquad \frac{x}{2}+\frac{3}{2}=5$$

a. Examine each of the equations above. Circle the equations that are equivalent. (You can do this with your shape tool. Select the oval tool and drag over the equations. Make sure you do not fill the shape.)

b. Solve each of the equations. (Insert a picture of each problem below. YOU WILL HAVE 4 PHOTOS TO INSERT BELOW.)

Did you find that some equations were easier to solve than others? Why or why not?

When faced with an equation with fractions, we can transform it into an equation that does not contain fractions. This is called **clearing of fractions**. In the problems above, in order to clear the fractions, we need to get rid of the 2 in the denominator of each equation.

c. Can you think of a way to eliminate the 2 in each equation before you start to solve the equation? Test your method and re-solve each of the equations above. Replace your pictures above with the new method.

Lesson 1.1d cont. Work each problem on your paper and insert a photo of your work below each problem.

2. $\frac{x-1}{4} = 6$	3. $\frac{x}{2} + \frac{1}{4} = \frac{7}{4}$	4. $\frac{1}{3}(2x - 4) = -6$

Lesson 1.1d cont. Work each problem on your paper and insert a photo of your work below each problem.

5. $\frac{2x}{3} + 4 = \frac{14}{3}$

6. $\frac{4}{5} = 3x + \frac{1}{5}$

7. $\frac{-2x-5}{3} = 3$

Lesson 1.1d cont. Work each problem on your paper and insert a photo of your work below each problem.

8. $\frac{x}{12}+\frac{1}{3}=\frac{1}{4}$

9. $-6=\frac{(3x-12)}{3}$

10. $\frac{1}{2}(4x+12)=2$

Lesson 1.1d cont.

Helpful IXL Lessons…

IXL – 6th Grade> Z.10 Solve one-step addition and subtraction equations with decimals, fractions, and mixed numbers 5D2 Link

IXL – 6th Grade> Z.11 Solve one-step multiplication and division equations with decimals, fractions, and whole numbers T53 Link

IXL – Algebra 1>J.11 Solve linear equations: mixed review DN6 Link

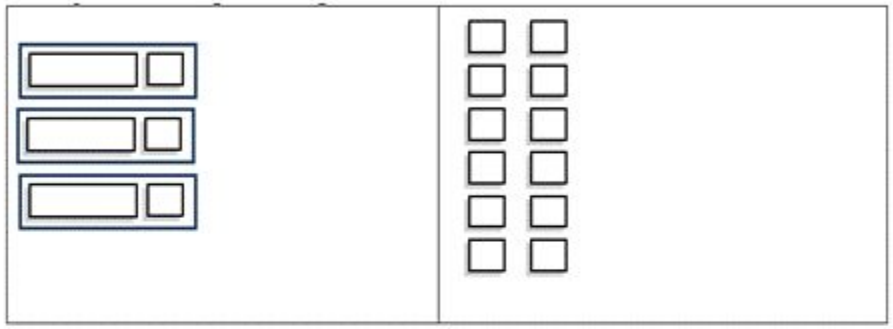
Assistments Homework Problems

NONE

Lesson 1.1e

Lesson 1.1e Video

1. The following is a model of the equation $3(x + 1) = 12$. Create this model on your paper and solve the equation.



Insert a photo of your work below.

Model and solve for numbers 2-4.

L1.1e part 2.webm

2. $2(x + 5) = 14$

Insert a photo of your work below.

Lesson 1.1e cont.

3. $2(3x + 1) - 2x = 10$

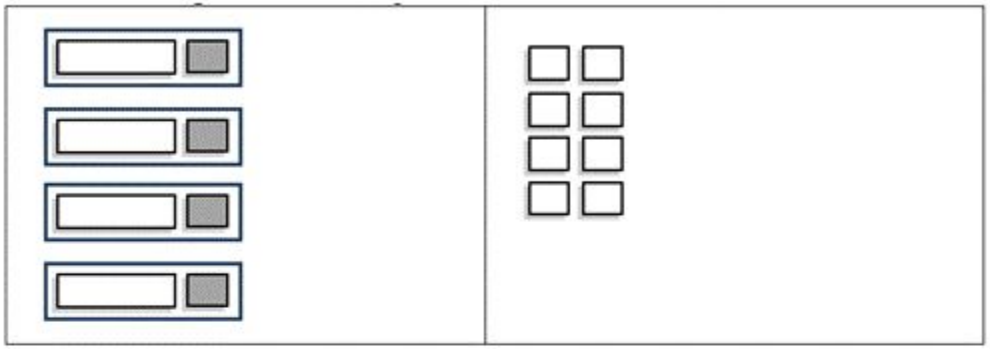
Insert a photo of your work below.

4. $-12 = 3(x - 2)$

Insert a photo of your work below.

Lesson 1.1e cont.

5. The following is a model of an equation.



a. Write the symbolic representation for this model. Add a textbox with your answer here.

b. Solve the equation algebraically or by modeling.

Insert a photo of your work below.

Solve 6-11 algebraically (without using tiles). Insert photos of your work below each problem.

6. $-2(x+1)=8$

7. $13=-3(x-4)-8$

Lesson 1.1e cont.

8. $5 + 2(3a - 1) = 15$

9. $\frac{1}{2}(2t + 4) = -8$

10. $\frac{x}{3} + \frac{x-2}{5} = 6$

11. $14 = 5 - 3(x - 2)$

Lesson 1.1e cont.

12. Part of a story that matches the expressions and equation shown on the left has been written for you. Finish the story by typing in the highlighted area, solve the equation and post a picture of it below, and determine how much time Theo spends training in each sport by plugging the solution into each of the three expression given.

Triatholon Training Schedule

Minutes spent swimming: x

Minutes spent running: $2x$

Minutes spent biking: $2x + 30$

$3x + 4(2x) + 2(2x + 30) = 510$ min.

Story

Theo is training for a triathlon. He runs twice as long as he swims. He bikes...

He swims three times a week, runs four times a week, and bikes...

If he spends a total of 510 minutes per week training, how many minutes does he spend on each exercise at a time?

Sport	Expression	Time Spent
Minutes Spent Swimming	x	
Minutes Spent Running	2x	
Minutes Spent Biking	2x + 30	

Lesson 1.1e cont.

13. Write a story that matches the expressions and equation shown on the left. Write your own story, solve the equation and post a picture of it below, and determine how each ride costs by plugging the solution into each of the three expression given.

A Trip to the Fair

Cost of a pony ride: b

Cost to ride the Ferris wheel: $\frac{1}{2}b$

Cost to bungee jump: $2b + 5$

$$3b + 4\left(\frac{1}{2}b\right) + (2b + 5) = \$33$$

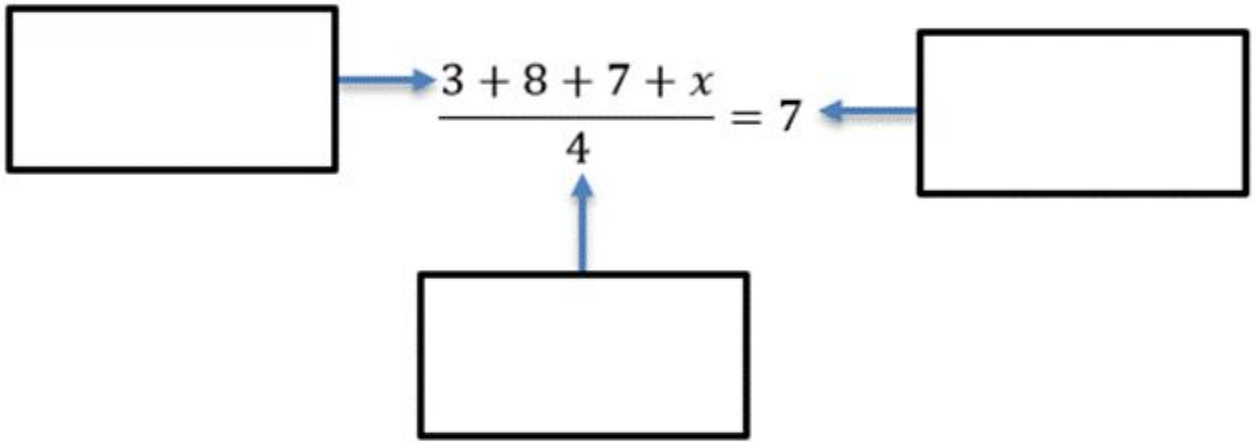
Story

Fair Rides	Expression	Cost Per Ride
Cost of a Pony Ride	b	
Cost to Ride the Ferris Wheel	$\frac{1}{2}$b	
Cost to Bungee Jump	2b + 5	

Lesson 1.1e cont.

14. Solve this riddle. "Consider the numbers 3, 8, and 7. Find a fourth number so that the average of the numbers is 7." The following equation represents this situation.

a. Fill the boxes below telling what each piece of the equation represents.



b. Solve the equation and find the fourth number. Insert a photo of your work below.

Lesson 1.1e cont.

Helpful IXL Lessons…

IXL – 8th Grade>W.9 Solve multi-step equations 55K Link

IXL – 8th Grade>W.13 Solve equations: complete the solution PGH Link

Assistments Homework Problems

PSA569K - 1.1e Homework: Solving Multi-Step Linear Equations (distribute and combine like terms) (7.NS.2d, 7.NS.3, 7.SP.5, 7.SP.6, 7.EE.3) Link

Lesson 1.1f

1.1F.mp4 Video

1. Use the story below about Chloe and her friends to answer the questions that follow.

Story

Chloe and her friends are going on a picnic. A sandwich is 6 times the cost of a cookie. A bag of chips is one and a half times the cost of a cookie. A soda is twice the cost of a cookie.

a. Write expressions for the cost of each item if the cost of a cookie is *x*.

Going on a Picnic
Cost of a sandwich: _____

Cost of a bag of chips: _____

Cost of a cookie: ___*x*_____

Cost of a soda: _____

b. Chloe and her friends buy 2 sandwiches, 3 bags of chips, 4 cookies, and 2 sodas. They spend a total of $12.25. Use this information and the expressions you wrote to the left to write an equation representing this situation. Hint: 4 cookies will look like this in the equation 4(x). Insert your answer in a text box below.

c. Solve your equation to determine the cost of each item. Insert a photo of your work below and your answers in the table provided.

Item	Expression	Cost
Sandwich		
Bag of Chips		
Cookie	x	
Soda		

Lesson 1.1f cont.

2. Uncle Hank loves riddles. Uncle Hank tells his nephews, "I have twice as many dimes as quarters. I have 12 more nickels than quarters. I have $4.60 total. Whoever can solve my riddle will get my coins."

a. Owen has a good start on an equation for solving this riddle. Help Owen fill in the missing pieces of the equation on the lines below by inserting text boxes with your answers.

$$0.25q + \_\_\_\_\_(2q) + 0.05\_\_\_\_\_ = 4.60$$

b. How many of each type of coin does Uncle Hank have? Solve the equation and insert a photo of your work. Then fill in the chart below.

Coin	Expression	Number of Coins
Quarters	q	
Dimes		
Nickels		

3. Use the story below about Farmer Ted and his animals to answer the questions that follow.

Story

Farmer Ted is weighing his animals. He knows that a pig weighs approximately $\frac{1}{4}$ as much as a cow. He also knows that a Clydesdale horse weighs about twice what a cow weighs. A sheep weighs approximately 100 pounds less than a pig.

a. Write the expressions that match the weight of each of the animals if a cow weighs *c* pounds.

Animal	Expression	Weight
Cow	C	
Horse		
Sheep		
Pig		

b. Write an expression for the weight of one cow, one horse, one sheep, and one pig.

c. If Farmer Ted puts 3 cows, 2 Clydesdale horses, 4 sheep and 1 pig on a giant scale used for weighing semi-trucks, the scale reads 7,850 pounds. Approximately how much does each animal weigh? Fill in your answers in the chart above.

Lesson 1.1f cont.

4. Miley is trying to solve the following riddle: "The sum of three consecutive integers is 84. What are the integers?" She writes part of an equation that can be used to solve this riddle.

a. Help Miley complete the equation below by filling in the blank.

second integer

$$n + (n + 1) + (\_\_\_\_\_) = 84$$

first integer

b. Find the three integers. Insert a photo of your work below along with the answers. Check to see if you are correct!

5. Eli is making lemonade for a party. Expressions showing the ratio of water to sugar to lemon juice used to make lemonade are shown on the right.

a. Write a story that matches the expressions and equation shown on the left and insert it below.

Making Lemonade

Cups of water: c

Cups of sugar: $\frac{1}{4}c$

Cups of lemon juice: $\frac{1}{2}c$

b. Solve the equation to the right. How many cups of each ingredient is Eli planning to use? Insert a photo of your work below and fill in the table.

$$c + \frac{1}{4}c + \frac{1}{2}c = 14 \text{ cups}$$

Ingredient	Expression	Amount Used
Water	c	
Sugar	$\frac{1}{4}c$	
Lemon Juice	$\frac{1}{2}c$	

Lesson 1.1f cont.

6. Use the incomplete story and the expressions and equation below to answer the questions that follow.

Triangles

$m\angle A: x$

$m\angle B: 3x$

$m\angle C: x - 20$

$x + 3x + (x - 20) = 180^\circ$

Story

In ΔABC, the measure of $\angle B$ is three times larger than...

The measure of $\angle C$ is 20° less than...

The sum of the angles in a triangle is...

What is the measure of each angle in the triangle?

a. Finish the story above so that it matches the expressions and equation shown above.

b. What is the measure of each angle in the triangle?

Angle	Expression	Measure of Angle
Angle A	x	
Angle B	3x	
Angle C	x - 20	

Lesson 1.1f cont.

7. In ΔRST, $\angle R$ and $\angle S$ have the same measure. The measure of $\angle T$ is $\frac{1}{2}$ the measure of $\angle R$ and $\angle S$. Marie drew the following model and picture to represent this situation:

$\angle R$

$\angle S$

$\angle T$

a. Help Marie write an equation that represents the sum of the angles in ΔRST. Remember the sum of the angles in a triangle is 180°.

Equation:

b. Solve the equation and find the measure of each angle. Insert a photo of your work on the right and fill in the table below.

Photo of work here:

Angle	Expression	Measure of Angle
R		
S		
T		

Lesson 1.1f cont.

8. Use the expressions and equation to the right to answer the questions that follow.

Rectangles
Width of a rectangle: w
Length of a rectangle: $2w$
$2w + w + 2w + w = 42$ ft.

- Write a story in the space provided that matches the expressions and equation.

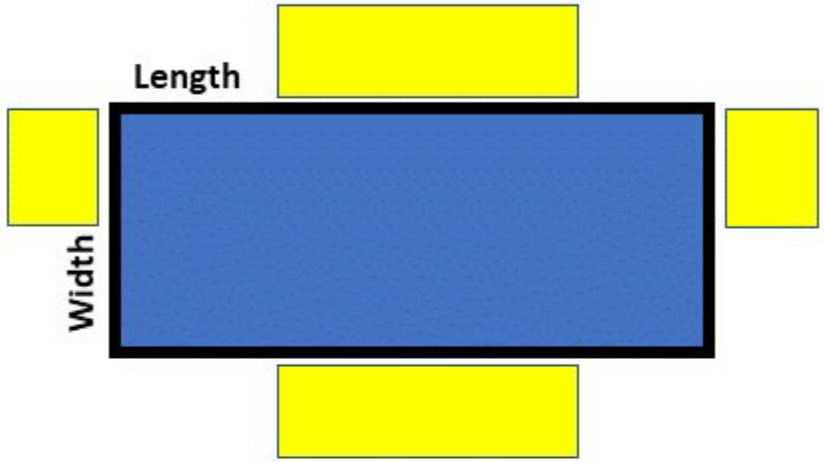
Story:

- What is a different but equivalent way of writing the equation above?

$2w + w + 2w + w = 42$

_____ $= 42$

- Label the picture of the rectangle to accurately depict the ratio of the length of the rectangle to its width.



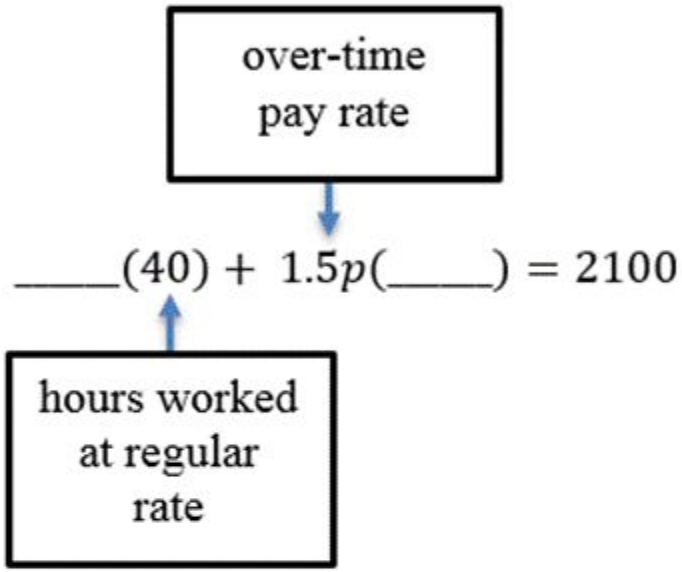
- Solve the equation and find the length and width of the rectangle.

Side	Expression	Measure in Feet
Width	w	
Length	$2w$	

Lesson 1.1f cont.

9. Josh works 40 hours a week as a nurse practitioner. He makes time and a half for every hour he works over 40 hours. Josh works 60 hours one week and earns $2100. Part of an equation that represents this situation is shown below.

a. Fill in the blanks in the equation so that it matches the story.



Type of Pay	Pay Rate	Hours Worked
Regular Hourly Rate		40
Overtime Hourly Rate	1.5*p*	

Insert Photo of work here.

b. What is Josh's regular hourly rate? _____

c. What is Josh's overtime hourly rate? _____

Lesson 1.1f cont.

10. The ratio of girls to boys at The Gymnastics Preparation Center is 3:2. If there are 180 kids that train at The Gymnastics Preparation Center, how many of them are girls? How many of them are boys?

INSERT IMAGE HERE

11. The average of three numbers is 14. The largest number is two more than twice the smallest. The second largest number is twice the smallest number. Find the three numbers.

INSERT IMAGE HERE

Lesson 1.1f cont.

Helpful IXL Lessons…

IXL – 8th Grade>W.4 Write and solve equations that represent diagrams G6N Link

Assistments Homework Problems

PSA57BY - 1.1f Homework: Creating and Solving Linear Equations to Model Real World Problems Part I (7.NS.2d, 7.NS.3, 7.SP.5, 7.SP.6, 7.EE.3) Link