We will solve$_1$ one-step equations.

CFU

What are we going to learn?

What does *solve* mean?
Solve means _____.

Activate Prior Knowledge

Inverse operations are operations that undo each other.

Inverse Operations

$+$ and $-$

$\bullet$ and $\div$

What operation would undo the change in value?

1. $6 + 2 = 8$

$8 \boxed{} 2 = 6$

2. $10 - 3 = 7$

$7 \boxed{} 3 = 10$

3. $4 \times 3 = 12$

$12 \boxed{} 3 = 4$

4. $15 \div 5 = 3$

$3 \boxed{} 5 = 15$

Make Connection

Students, you already know how to use inverse operations to undo a change in value. Now, we will solve one-step equations using inverse operations.

Vocabulary

$_1$ find the answer

A **one-step equation** contains[2] **one operation**.
A **one-step equation** requires[3] **one inverse operation** to solve for the variable.

- *To keep an equation __balanced__, inverse operations must be done on __both sides__ of the equation.*

The **solution** is the value of the **variable** that makes the equation <u>true</u>.

addition

$$x + 2 = 3$$

division

$$\frac{x}{4} = 1$$

Inverse Operations

$+$ and $-$

$\bullet$ and $\div$

Solving One-Step Equations

Inverse Operation

$$x + 2 = 3$$
$$\underline{-2 \quad -2}$$
$$x = 1$$

Balance

Inverse Operation $\quad 4 \bullet \dfrac{x}{4} = 1 \bullet 4 \quad$ Balance

$$x = 4$$

Solution

$x = 1$

$$x + 2 = 3$$
$$(1) + 2 \overset{?}{=} 3$$
$$3 = 3 \quad \textbf{True}$$

Solution

$x = 4$

$$\frac{x}{4} = 1$$

$$\frac{(4)}{4} \overset{?}{=} 1$$

$$1 = 1 \quad \textbf{True}$$

NOT a **Solution**

$x = 4$

$$x + 2 = 3$$
$$(4) + 2 \overset{?}{=} 3$$
$$6 \neq 3 \quad \textbf{False}$$

Go to Skill Dev 2

Go to Skill Dev 1

CFU 1

Which inverse operation would be used to solve the one-step equation $x - 4 = 6$? How do you know?
A Addition   B Subtraction
What is the difference between the solution $(x = 1)$ and the non-solution $(x = 4)$?

CFU 2

Which inverse operation would be used to solve the one-step equation $4x = 8$? How do you know?
A Multiplication   B Division

Vocabulary

[2] has within it
[3] needs (synonym)

CA 6th Grade Algebra and Functions 1.1 (6Q)
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 - *To keep an equation **<u>balanced</u>**, **inverse operations** must be done on <u>both sides</u> of the equation.*

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Solve one-step equations.	**<u>Inverse Operations</u>**
❶ Read the problem and connect it to the equation.	$+$ and $-$
❷ Solve for the variable. Hint: Use the inverse operation.	$\bullet$ and $\div$
❸ Check and interpret[4] the solution. Hint: Answer the question.	

1. Isabella is baking muffins. The recipe calls for 8 cups of sugar. Isabella has already added 3 cups of sugar. How many more cups of sugar does she need to add?

$$c + 3 = 8$$

Isabella needs to add _____.

2. Yesterday, Samuel had $7. He was given more money today and now has $10. How much money was Samuel given today?

$$m + 7 = 10$$

Samuel was given _____ today.

3. Shannon had some money in her pocket. She spent $4 of it on school supplies. She now has $11. How much money did she start with?

$$m - 4 = 11$$

Shannon started with _____.

4. Jessie had a handful of marbles. He gave 5 of them away and now has 8. How many marbles did Jessie start with?

$$m - 5 = 8$$

Jessie started with _____.

CFU

❶ How did I/you connect the problem to the equation?
❷ How did I/you solve for the variable?
❸ How did I/you interpret the solution?

↺ *Back to Concept Dev*

Vocabulary

[4] explain (synonym)

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Solve one-step equations.
❶ Read the problem and connect it to the equation.
❷ Solve for the variable. Hint: Use the inverse operation.
❸ Check and interpret the solution. Hint: Answer the question.

Inverse Operations
+ and −
• and ÷

1. Binders cost $2 each. If Miguel has $12, how many binders can he buy?

$$2b = 12$$

Miguel can buy _____.

2. A box of pencils has 6 pencils inside. If Rosalina has 24 pencils, how many boxes does she have?

$$6b = 24$$

She has _____.

3. Isabella gave out muffins to her 6 friends. If each friend was given 4 muffins, how many muffins did Isabella give out?

$$\frac{m}{4} = 6$$

Isabella gave out _____.

4. Ricky and his two friends earned money doing chores for his neighbor. After splitting the money, they each got $7. How much money did they earn together?

$$\frac{m}{3} = 7$$

Ricky and his friends earned _____.

CFU
❶ How did I/you connect the problem to the equation?
❷ How did I/you solve for the variable?
❸ How did I/you interpret the solution?

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1 *Solving one-step equations will help you solve more complex equations.*

$$5x - 6 = 4$$
$$+ 6 + 6$$
$$\frac{5x}{5} = \frac{10}{5}$$
$$x = 2$$

2 *Solving one-step equations will help you do well on tests.*

Sample Test Question:

37. What value of *k* makes the following equation true?

$$k \div 3 = 36$$

A 108
B 98
C 39
D 12

Does anyone else have another reason why it is relevant to solve one-step equations? (Pair-Share) Why is it relevant to solve one-step equations? You may give one of my reasons or one of your own. Which reason is more relevant to you? Why?

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Solve one-step equations.

1 Read the problem and connect it to the equation.
2 Solve for the variable. Hint: Use the inverse operation.
3 Check and interpret the solution. Hint: Answer the question.

Inverse Operations

$+$ and $-$

$\bullet$ and $\div$

1. Angelina needs to save $20. She has already saved $9. How much more money does Angelina need to save?

$$m + 9 = 20$$

Angelina needs to save _____.

2. A can of tennis balls has 3 tennis balls inside. If Frank has 18 tennis balls, how many cans of tennis balls does he have?

$$3c = 18$$

Frank has _____.

$$m + 2 = 6$$

Sam's solution

$$m = 8$$

Sam is trying to solve the equation on the left. After applying one inverse operation, his solution was $m = 8$. Explain why his solution is incorrect and what possible error he may have made.

_____

_____

_____

What did you learn today about solving one-step equations? (Pair-Share)

Day 1 _____

_____

Day 2 _____

_____

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Solve one-step equations.	**<u>Inverse Operations</u>**
❶ Read the problem and connect it to the equation.	$+$ and $-$
❷ Solve for the variable. Hint: Use the inverse operation.	• and $\div$
❸ Check and interpret the solution. Hint: Answer the question.	

1. Gabriel is baking cookies. The recipe calls for 6 cups of flour. If Gabriel has already added 2 cups of flour, how much more flour does he need to add?

$$c + 2 = 6$$

Gabriel needs to add _____.

2. Louisa had a handful of nickels. She gave 8 of them away and now has 4. How many nickels did Louisa start with?

$$n - 8 = 4$$

Louisa started with _____.

3. Books cost $5 each. If Mathew has $35, how many books can he buy?

$$5b = 35$$

Mathew can buy _____.

4. Jenny and her 4 friends earned money selling sugar-free lemonade. After splitting the money, they each got $9. How much money did they earn together?

$$\frac{m}{5} = 9$$

Jenny and her friends earned _____.

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Solve one-step equations.	**Inverse Operations**
❶ Read the problem and connect it to the equation.	$+$ and $-$
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1. Carmella is baking biscuits. The recipe calls for 11 cups of flour. She has already added 6 cups. How much does she still have to add?

$$f + 6 = 11$$

Carmella needs to add _____.

2. Fernando is building a bookshelf. He has used 26 pieces. He has 12 of the pieces left. How many pieces does the bookshelf have?

$$p - 26 = 12$$

The bookshelf has _____.

3. Claire made 6 batches of meatballs. She made a total of 48 meatballs. How many meatballs does each batch make?

$$6m = 48$$

Claire made _____.

4. Tyrone and his three friends are going to split a box of crackers. They each get 14 crackers. How many crackers were in the box?

$$\frac{c}{4} = 14$$

There were _____.

Name

A **one-step equation** requires <u>one inverse operation</u> to solve for the variable.
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Solve one-step equations.	**Inverse Operations**
❶ Read the problem and connect it to the equation.	+ and −
❷ Solve for the variable. Hint: Use the inverse operation.	• and ÷
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1. Larissa has 17 dollars. She gets her allowance. Now she has 28 dollars. How much was her allowance?

$$17+a=28$$

Larissa's allowance is _____.

---

2. A set of colored pencils has 45 pencils taken out. There are currently 29 pencils left. How many pencils were there originally?

$$p-45=29$$

There were _____ originally.

---

3. Geoffrey earns $7 for mowing lawns. Last month, he earned $42. How many lawns did he mow?

$$7m=42$$

Geoffrey mowed _____.

---

4. Thomas and his 5 friends made cookies. They shared them equally and each got 13. How many cookies did they make altogether?

$$\frac{c}{6}=13$$

Thomas and his friends made _____.

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Solve one-step equations.	**Inverse Operations**
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1. Estevan worked on his English homework for 25 minutes. He finished all his homework in 57 minutes. How long did it take him to finish the rest of his homework?

$$25 + h = 57$$

It took Estevan _____.

2. Elizabeth had several colored pencils. She gave out 14 of them to her friends and how has 13. How many pencils did she start with?

$$c - 14 = 13$$

Elizabeth had _____.

3. Javier can make 7 paper airplanes each hour. If he made 28 airplanes, how long did he spend making them?

$$7a = 28$$

Javier spent _____.

4. Adolfo and his six friends earn money doing yard work. After splitting up the money, they each got 15 dollars. How much money did they earn together?

$$\frac{y}{7} = 15$$

Adolfo and his friends earned _____.

Name

A **one-step equation** requires <u>one inverse operation</u> to solve for the variable.
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The **solution** is the value of the **variable** that makes the equation <u>true</u>.

Inverse Operations

$+$ and $-$

$\bullet$ and $\div$

1. Geoffrey earns $7 for mowing lawns. Last month, he earned $42. How many lawns did he mow? $7m = 42$

Which of the following statements is true? How do you know?

a. The inverse operation used to solve this problem is division ($\div$). Yes/No

b. The meaning of the solution to this problem is the amount of money earned. Yes/No

c. The meaning of the solution to this problem is the number of lawns mowed. Yes/No

d. The first step in isolating the variable is to divide both sides of the equation by m. Yes/No

_____

_____

2. A set of colored pencils has 45 pencils taken out. There are currently 29 pencils left. How many pencils were there originally? $p - 45 = 29$

Which of the following statements is true? How do you know?

a. The inverse operation used to solve this problem is subtraction (-). Yes/No

b. The meaning of the solution to this problem is the original number of pencils. Yes/No

c. The meaning of the solution to this problem is the number of pencils left. Yes/No

d. The first step in isolating the variable is to add 45 to each side of the equation. Yes/No

_____

_____

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The **solution** is the value of the **variable** that makes the equation <u>true</u>.

Inverse Operations
$$+ \text{ and } -$$
$$\bullet \text{ and } \div$$

1. Estevan worked on his English homework for 25 minutes. He finished all his homework in 57 minutes. He worked out how long it took him to finish the rest of his homework below, but his older sister told him his answer was incorrect. Where did Estevan make a mistake? How can he fix it?

$$25 + h = 57$$
$$\underline{+\,25 \qquad +\,25}$$
$$h = 82$$

_____

_____

_____

2. Javier can make 7 paper airplanes each hour. He made 28 airplanes and has calculated how long he spent making them. Explain how he can check that his answer is correct. Is his answer correct?

$$\frac{7a}{7} = \frac{28}{7}$$
$$a = 4$$

_____

_____

_____

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Inverse Operations

  $+$ and $-$

  $\bullet$ and $\div$

1. Thomas and his 5 friends made cookies. They shared them equally and each got 13. How many cookies did they make? $c \div 13 = 6$

Which of the following statements is true? How do you know?

  a. The inverse operation used to solve this problem is multiplication (x).   Yes/No

  b. The meaning of the solution to this problem is the amount of cookies made.   Yes/No

  c. The meaning of the solution to this problem is the number of cookies shared
      equally.   Yes/No

  d. The first step in isolating the variable is to multiply each side of the   Yes/No
      equation by c.

_____

_____

3. Claire made 6 batches of meatballs. She made a total of 48 meatballs. How many meatballs does each batch make? $m \div 6 = 48$

Which of the following statements is true? How do you know?

  a. The inverse operation used to solve this problem is multiplication ($\times$).   Yes/No

  b. The meaning of the solution to this problem is the number of meatballs made in
      each batch.   Yes/No

  c. The meaning of the solution to this problem is the number of meatballs made in Yes/No
      total.

  d. The first step in isolating the variable is to divide both sides of the equation by m. Yes/No

_____

_____

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