

**?**

**W**

**2K**

**Use** the properties of

to solve.

**Isolate** the variable term on one

side and the on the other.

**Solve** equations with variables on both sides.

**Lesson Goals**

**Words to Know**

*Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.*

properties of

equality

A. to separate from other substances; to place apart

a letter or symbol used to represent an unknown quantity

the rules that allow you to balance, manipulate, and solve equations

the number value in a monomial

**Lesson Question**

|  |  |  |
| --- | --- | --- |
|  | | B. |
|  | variable |  |
|  | coeffcient  isolate | C.  D. |



## Using Algebra Tiles to Solve an Equation

Use algebra tiles to solve 4*x* = 3*x* − 3.



*x x x x*

|  |  |  |  |
| --- | --- | --- | --- |
| *x* | | |  |
| *x* | | |
| *x* | | |
|  |  |  | |

1. Isolate the *x*-term on the left side of the equation.
   * Drag 3 blue rectangular *x*-tiles to the right side. This makes 3 zero pairs and leaves no *x*-tiles on the right side.
   * Drag 3 blue rectangular *x*-tiles to the left side to keep the equation balanced. This makes 3 zero pairs and leaves 1 orange positive

*x*-tile on the left side.

*x*



|  |  |  |
| --- | --- | --- |
|  |  |  |

4*x* = 3*x* − 3

*x* =

**Slide**

*x* 

.

the

*2 2*

*7*  *2x*

2. Use the multiplication or division property of equality to solve for

−7 =

*–*2*x*

−2*x*

Solve the equation.

2*x* − 7 = 4*x*

2*x* − 7 = 4*x*

Use the addition or subtraction **property of equality** to **isolate** the **variable** term.

1.

**Isolating the Variable**

**PROCEDURE**

Steps for Solving

**2**

So, our solution is correct.

28

14

 2  7   2

−7 = −14

= −14











 2 

2 7  7  4

*2*

Verify that *x*  *7* is the solution for the equation 2*x* − 7 = 4*x.*

**Verifying a Solution**

**Slide**

## Solving for a Variable with Decimals on Both Sides

**EXAMPLE**

Steps for Solving

1. Isolate the variable term to one side of the equals sign.

Solve the equation.

5.3*x* = 4.1*x* + 5.76

5.3*x* = 4.1*x* + 5.76

−4.1*x* −4.1*x*

= 5.76

1. Use the inverse operation to

1.2*x*

5.76

remove the **coeicient**. 

1.2

5.76

*x*  1.2

10

 10

**4**

*x* 12

*x* =

**Slide**

## A One-Variable Equation with Fractions

Steps for Solving

1. Use the addition or subtraction

Solve the equation.

8  3 *x*  1 *x*

property of equality to isolate the term.

4

3

8  *x*

4

3

2

1

 2 *x*

3

 4 *x*  4 *x*

8 

1. Use the multiplication or division property of equality to solve for the variable.

4

5 i 8

4 5

 5 i 4 *x*

**6**

 *x*

**Slide**

## Solving More than One Way

Solve the equation.

3*x* + 4 = 5*x* + 9

Isolate the variable term on the right.

3*x* + 4 = 5*x* + 9

−3*x* −3*x*

4 = + 9

−9 − 9

= 2*x*

Isolate the variable term on the left.

3*x* + 4 = 5*x* + 9

− 5*x* − 5*x*

+ 4 = 9

− 4 − 4

−2*x* =

5 2*x*



2 2

2*x*

2

5

 2

5

*x* *x*

**10**

  2

**Slide**

## Solving an Equation with Fractions

Solve the riddle.

9 minus three-fourths of a number is the same as seven less than half the number.

9  3 *x*  1 *x*  7

4 2

9  3 *x*  1 *x*  7

4

3

* 4 *x*

2

3

* 4 *x*

*9*   *7*

+7 7

5

16 i 4

 *x*

4

4 5

 i *x*

5 5 4

**12**

 *x*

**Slide**

## Verifying a Solution

64

Verify that *x*  5 is the solution for the equation.

3 1

9  *x*  *x*  7

4 2

3  64  1 

9  4 

2



5

5   

  7



# 9  5 

32

5  7

**12**

# 5 48  32





5

5

3 3

5  5

Therefore, our solution is correct.

**?**

**2**

2. Use the multiplication or division property of equality to solve for the variable.

on opposite sides of the equation.

term and the

**Review: Key Concepts**

Steps to Solve

1. Use the addition or subtraction properties of equality to isolate the variable

How can you solve equations with variables on both sides of the equals sign?

**Lesson Question**

**Answer**

*Use this space to write any questions or thoughts about this lesson.*