**Words to Know**

*Fill in this table as you work through the lesson. You may also use the glossary to help you.*

# Combining Like Terms to Solve Equations



**?**

**W2K**

**Use** the properties of

to solve linear

equations.

terms.

**Identify** like terms.

**Combine**

**Lesson Goals**

**Lesson Question**

**Warm-Up**

|  |  |
| --- | --- |
| addition property of equality | the property stating that adding the quantity to both sides of an equation does not change the solution set |
| division property of equality | the property stating that dividing both sides of an equation by the  same number does not change the equation |
| inverse operations | “ ”  operations that each other, such as addition  and subtraction or multiplication and division |
| multiplication property of equality | the property stating that multiplying sides of an equation by the same value does not change the equation |
| subtraction property of equality | the property stating that subtracting the same quantity from  both sides of an equation does change the equation |

**Slide**

*x* 

5

2



5

2



2

*x* + 5 = 8

Solve:

•

*x* =

* **Subtraction Property of Equality**

*a* − *c* = *b* −

Solve: *x* − 4.3 = 0.55

+ 4.3 + 4.3

= *b* + *c*

*a* +

•

* **Addition Property of Equality**

**Inverse Operations and Properties of Equality**

**Inverse operations** are operations that “undo” each other: addition and subtraction, multiplication and division.

**2**

33

5.5  5.5

*x* =

5.5*x*

*a* ÷ *c* = *b* ÷ *c* for *c* ≠

Solve: 5.5*x* = 33

* **Division Property of Equality**

3(*x* ÷ 3) = 3(6)

*x* =

*x*  6

3

or

Solve: *x* ÷ 3 = 6

* **Multiplication Property of Equality**

*a* × *c* = *b* ×

**More Properties of Equality**

Inverse operations are operations that “undo” each other: addition and subtraction, multiplication and division.

**Slide**

## Combine Like Terms to Solve an Equation

### PROCEDURE

1. Identify and like terms.

5*x* + 6*x* = 66

1. Use the properties of 66



and inverse

**5**

operations to solve the equation.

1. Check your answer.

11

*x* = 6

**Check:** 5( ) + 6(6) = 66

30 + = 66

66 = 66 P

**Slide**

## Writing and Solving an Equation

### REAL-WORLD CONNECTION

Mrs. Garner needs to arrange 28 desks into rows on each side of her classroom with an aisle in the middle. There is room for 4 rows on the left side, but only 3 rows on the right side. How many desks should be in each row on the right?

1. Write an equation.

*x* = number of desks in each row

+ 3*x* =

1. Identify and combine like terms.

*7x*

= 28

*28*

1. Use the properties of equality  *7*

and operations

to solve the equation.

1. Check your answer.

*x* = 4

4(4) + 3(4) = 28

+ 12 = 28

28 = 28 P

**5**

There should be 4 desks in each row on the right.

**Slide**

## Equations Algebra Tiles Interactive

Solve using Algebra tiles:

4*x* − 3 = 5

**8**



*x x x x*

− − −

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| + | + | + | + | + |

=

*x*

=

+ +

1. Model the equation using algebra tiles.
2. Use the addition property of equality. Drag 3 orange square tiles to each side to add 3 to both sides of the equation.

4*x* − 3 = 5

+3 +3

4*x* =

1. Click the button to divide both groups by 4.

4*x* 8

4

*x* =

**Slide**

## How to Solve Two-Step Equations

### PROCEDURE

1. Undo or

subtraction to isolate the variable term.

Solve 3.25*x* − 4 = 15.5 for *x*.

3.25*x* − 4 = 15.5

+ 4 + 4 3.52*x* =

1. Undo multiplication or

to isolate the

3.25*x*

3.25



# 19.5

**10**

variable. *x* =

1. Check your answer. Check: 3.25(6) − 4 = 15.5 19.5 − 4 = 15.5

= 15.5 P

So *x* = 6 is the correct answer.

**Slide**

## Using an Equation to Solve a Word Problem

Morgan wants to buy a new smartphone that costs $172. She has already saved

$70. She makes $8.50 per hour babysitting. How many hours will Morgan have to babysit to earn the rest of the money?

1. Write an equation.

*h* = number of

#  70 

1. Undo addition or subtraction.

  70

8.50*h*

70

 102

1. Undo multiplication or division.

8.50*h* 

*h* =

102

8.50

4. Check your answer.

8.50(12) + 70 =

+ 70 = 172

172 = 172 P

**10**

Morgan will have to work 12 hours to save up for her new smartphone.

**Slide**

## How to Solve Multi-Step Equations

### PROCEDURE

Solve the equation for *x*.

1. Identify and combine like terms.
2. Undo addition or subtraction to isolate the variable term.

−3*x* + 6*x* + 4 = 13

+ 4 = 13

−4 −4

3*x* =

**12**

1. Undo multiplication or division to isolate the variable.
2. Check your answer.

3*x*  9

3 3

*x* =

−3(3) + 6(3) + 4 = 13

+ 18 + 4 = 13

9 + 4 = 13

= 13 P



# Combining Like Terms to Solve Equations

**?**

How can you solve linear equations by combining like terms?

**Lesson Question**

**Answer**

**Summary**

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