**Words to Know**

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

**Warm-Up** Analyzing Solutions

**?**

**W2K**

**Identify** the number of

solutions.

types.

equations.

**Write** equations

**W**wi**r**t**i**h**te**different

**Solve** one-variable

**Lesson Goals**

**Lesson Question**

|  |  |
| --- | --- |
| interpret | to explain in understandable terms; to understand accordingto beliefs |
| equivalent equation | equations that have the same solution set and can be formedfrom one another using the properties of |
| properties of equality | the rules that allow you to , manipulate, and solve equations |
| solution of a one-variable equation | a value of the variable in an equation that makes theequation |

**Slide**

## Solving a One-Variable Linear Equation

Use the **properties of equality** to solve the equation.

3(*x* + 6) = 2(*x* − 3) + 4*x*

3*x* + = 2*x* − 6 + 4*x*

3*x* + 18 = 6*x* − 6

−3*x* −3*x*

18 = − 6

+6 +6

24 = 3*x*

24  3*x*

**2**

3

*x* =

* What is the number of **solutions to the one-variable equation**?

Verify that the solution is correct by plugging it back into the equation.

*x* = 8

3(8 + 6) = 2(8 −3) + 4(8)

# 3( ) = 2(5) +

= 10 + 32

42 = 42

This is a statement. So, the solution *x* = 8 is correct.

**Slide**

## Finding the Number of Solutions

Use properties of equality to solve the equation.

8(*x* + 4) = 4(*x* + 8) + 4*x*

8*x* + 32 = + + 4*x*

8*x* + 32 = + 32

−8*x* −8*x*

32 =

On the left, the to

the variable and the constant are the

as on the right-hand side of

the equation. Whenever this happens, we have infinitely many solutions.

**4**

* + What is the number of solutions to the one-variable equation?

many

**Slide**

What is the number of solutions to the one-variable equation?

see that, there is no solution.

. Anytime you

are

same coefficient, but the constants

−5*x*

terms have the

The

+ 28

5*x* − 3 =

−5*x*

≠

− 2*x*

5*x* − 3 = 7*x* +

**Finding the Number of Solutions**

Use properties of equality to solve the equation.

5*x* − 3 = 7(*x* + 4) − 2*x*

**Equivalent Equations**

*Complete the table.*

**6**

**9**

|  |  |  |
| --- | --- | --- |
| **Equivalent Equation** | **What does this mean?** | **How many solutions exist?** |
| *x* = *a* | The equation is true only when the variable assumes the value of *a*. |  |
| *a* = *a* | The equation is true for any value of the variable. |  |
| *a* = *b* | There is no value of the variable that will make *a* equal to *b*. |  |

**Slide**

## Identifying the Number of Solutions

### EXAMPLE

Solve each equation and the result.

* 2(2*x* + 10) = 4(*x* − 5) +6

4*x* + 20 = 4*x* − 20 + 6

4*x* + 20 = 4*x* −

* 9(*x* − 2) = 9*x* − 18 9*x* − 18 = 9*x* − 18

solutions

**11**

solution

* + 8*x* − 4 − 2*x* = 2(5*x* − 2) 8*x* − 4 −2*x* = 10*x* − 4

6*x* − 4 = 10*x* − 4

−6*x* −6*x*

− 4 = 4*x* − 4

+4 +4

0 4

*x*

=

4

0 = *x x* =

e*x*actly solution

**Slide**

## Writing an Equation with No Solution

### PROCEDURE

Create a linear equation with no solution.

1. Start with a statement in the form *a* = *b*.
2. Add the same variable term to sides.
3. Add the same term to both sides.
4. Combine terms on each side.
5. Verify that the equation has no solution using the properties of equality.

**13**

2 = 6

3*x* + 2 = 6 + 3*x*

−10 + 3*x* + 2 = 6 + 3*x* − 10

−8 + 3*x* = −4 + 3*x*

−3*x* −3*x*

−8 = −4

This is not true. We end up with a statement, which means no solution.

**Summary** Analyzing Solutions

**?**

How can you identify the number of solutions of linear equations?

**Lesson Question**

**Answer**

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