Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Math Warm Up

Wednesday	My Thinking	Correct/Compare
$-\frac{x+2}{3}-\frac{4-2x}{2}=\frac{1}{6}$		

Lesson 3.1 Solving Linear Equations with one Variable (Day 8)

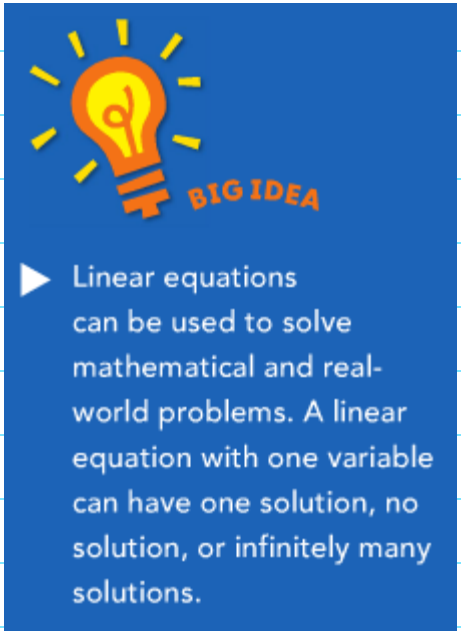
Wednesday	My Thinking	Correct/Compare
$-\frac{x+2}{3}-\frac{4-2x}{2}=\frac{1}{6}$		$x=\frac{17}{4}$

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Objective

TSW

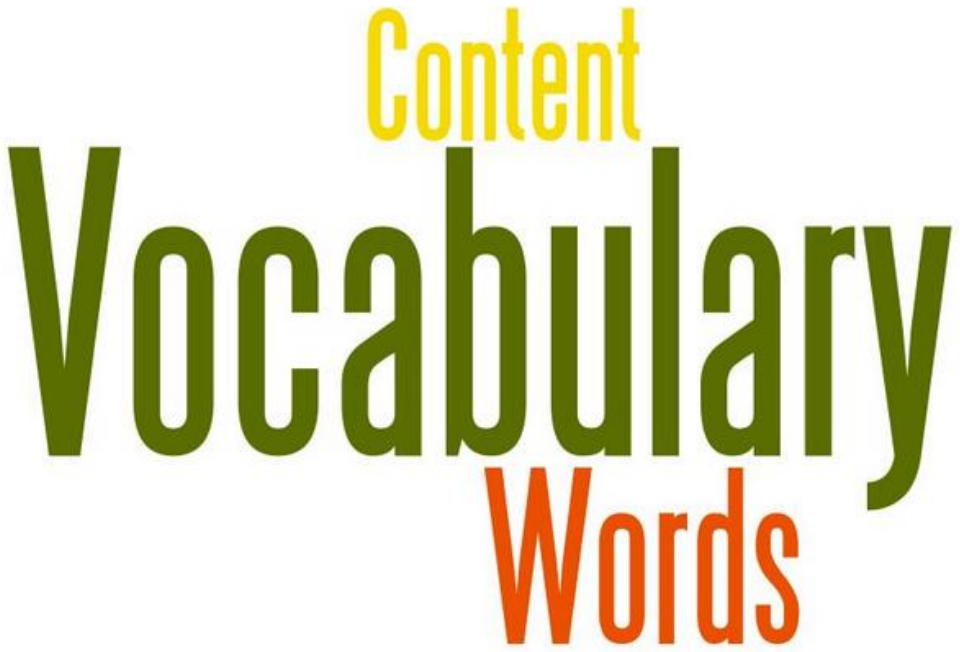
- Understand and identify linear equations with no solution.
- Understand and identify linear equations with infinitely many solutions



Common Core State Standards *8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solution*

Mathematical Practices *1 Solve problems/persevere 2 Reason 4 Model Mathematics 7 Look for and use structure*

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)



How do these vocabulary words relate to today's objective?

Consistent Equations

Def- An equation with one solution

Identity

Def- An equation that is always true no matter what value is plugged in for the variable. Infinite solutions!

Inconsistent Equation

Def- An equation with no solution

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Consistent Equations Def- An equation with one solution	**Example 4** $3(x - 4) = 2(x - 1)$

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Consistent Equations

Def- An equation with one solution

Example 4

$$3(x - 4) = 2(x - 1)$$

Caution

$x = 0$ means zero is the solution

Solution

$$3(x - 4) \stackrel{?}{=} 2(x - 1)$$

$$3x - 12 \stackrel{?}{=} 2x - 2 \qquad \text{Use the distributive property.}$$

$$3x - 12 - 2x \stackrel{?}{=} 2x - 2 - 2x \qquad \text{Subtract } 2x \text{ from both sides.}$$

$$x - 12 \stackrel{?}{=} -2 \qquad \text{Simplify.}$$

$$x - 12 + 12 \stackrel{?}{=} -2 + 12 \qquad \text{Add 12 to both sides.}$$

$$x = 10 \qquad \text{Simplify.}$$

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Inconsistent Equation

Def- An equation with no solution

Example 4

$$5(x + 3) = 5x + 3$$

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Inconsistent Equation

Def- An equation with no solution

Example 4

$5(x + 3) = 5x + 3$

Solution

$5(x + 3) \stackrel{?}{=} 5x + 3$

$5x + 15 \stackrel{?}{=} 5x + 3$ Use the distributive property.

$5x + 15 - 5x \stackrel{?}{=} 5x + 3 - 5x$ Subtract $5x$ from both sides.

$15 \neq 3$ Simplify.

Because $15 \neq 3$, the equation has no solution. So, the equation is inconsistent.

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Identity	$3x + 5 = x + 2x + 5$
Def- An equation that is always true no matter what value is plugged in for the variable. Infinite solutions!	

How can I remember what Identity means? Identity sounds like identical meaning both sides of the equal sign are identical or the same

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Identity

Def- An equation that is always true no matter what value is plugged in for the variable. Infinite solutions!

$$3x + 5 = x + 2x + 5$$

Caution

$5 = 5$ does not mean that $x = 5$.

$$3x + 5 \stackrel{?}{=} x + 2x + 5$$

$$3x + 5 \stackrel{?}{=} 3x + 5 \qquad \text{Combine like terms.}$$

$$3x + 5 - 3x \stackrel{?}{=} 3x + 5 - 3x \qquad \text{Subtract } 3x \text{ from both sides.}$$

$$5 = 5 \qquad \text{Simplify.}$$

Once again, the variable x has disappeared. $5 = 5$ is always true, no matter what the value of x is. Because the solving ends with a true statement, the equation has infinitely many solutions.

2 minute Commercial Break

Decide…

Partner Pepsi

Partner CocaCola

2 minute Commercial Break

Think about what you will say for 10 seconds before discussing..

Partner Pepsi-
Explain the vocabulary words and ways to remember the meaning

Partner CocaCola-
Explain examples and common mistakes that we know to look for

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Tell whether each equation is inconsistent, consistent or identity. Be sure to example if there are no solutions, one solution or infinite solutions.

Guided Practice 1	Type of Equation	Number of Solutions
$7(x-3)-7x-21=0$	*inconsistent	*no solution
	*consistent	*one solution
	*identity	*infinite many solutions

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Tell whether each equation is inconsistent, consistent or identity. Be sure to example if there are no solutions, one solution or infinite solutions.

Guided Practice 1

$7(x - 3) - 7x - 21 = 0$

Type of Equation	Number of Solutions
*inconsistent	*no solution
*consistent	*one solution
*identity	*infinite many solutions

1 $7(x - 3) - 7x - 21 = 0$

$7(x - 3) - 7x - 21 \stackrel{?}{=} 0$

$\underline{?}\,\underline{?}\,\underline{?} - 7x - 21 \stackrel{?}{=} 0$ Use the distributive property. $7x;\ -;\ 21$

$\underline{?} \neq 0$ Simplify. -42

Because $\underline{?} \neq 0$, the equation has $\underline{?}$ solution. The equation is $\underline{?}$. $-42;$ no; inconsistent

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Tell whether each equation is inconsistent, consistent or identity. Be sure to example if there are no solutions, one solution or infinite solutions.

Guided Practice 2	Type of Equation	Number of Solutions
$x + \frac{1}{4} = -\frac{1}{4}(4x - 1)$	*inconsistent	*no solution
	*consistent	*one solution
	*identity	*infinite many solutions

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Tell whether each equation is inconsistent, consistent or identity. Be sure to example if there are no solutions, one solution or infinite solutions.

Guided Practice 2	Type of Equation	Number of Solutions
$x + \frac{1}{4} = -\frac{1}{4}(4x - 1)$	*inconsistent	*no solution
	*consistent	*one solution
	*identity	*infinite many solutions

Since the equation has one solution $x = 0$, it is consistent

Lesson 3.2 Identifying the Number of Solutions in Linear Equations (Day 1)

Independent Practice #1-8

You may choose any 8 problems to solve

Name:_____ Independent Practice #1-8

Practice 3.2

Tell whether each equation has one solution, no solution, or an infinite number of solutions. Justify your answer.

1. $2x - 3 = -2\left(\frac{3}{2} - x\right)$
2. $2x + 5 = -4\left(\frac{3}{2} - x\right)$
3. $3x + 5 = 2x - 7$
4. $5y + (86 - y) = 86 + 4y$
5. $0.5(6x - 3) = 3(1 + x)$
6. $4(18a - 7) + 40 = 3(4 + 24a)$
7. $\frac{1}{7}(7x - 21) = 8x + 7x - 24$
8. $\frac{1}{6}(12x - 18) = 2\left(x - \frac{3}{2}\right)$
9. $7 - 0.75x = -7\left(\frac{3}{28}x + 1\right)$
10. $6 + 0.5y = -2\left(3 - \frac{1}{4}y\right)$
11. $\frac{x - 3}{4} = 0.25x - 0.75$
12. $\frac{1}{3}x + 5 = \frac{1}{6}(2x - 5)$

Challenge

16. *Math Journal* Look at this "proof" that $2 = 0$.

When $a = 1$ and $b = 1$, then	
$(a - b)(a + b) = 0$	
$a + b = 0$	Divide both sides by $a - b$.
$1 + 1 = 0$	Substitute for a and b.
$2 = 0$	Simplify.

What is wrong with this proof? How can a true statement lead to an inconsistent equation?

Course 3

Challenge- #16 IXL "Pick a pumpkin"

Homework

Name:_____ Date:_____

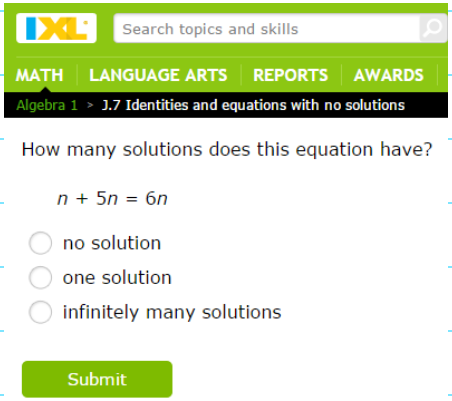
Wednesday Homework

Solve For each Variable AND Repeating Decimal #1-13

1. $7 - \frac{v}{4} = 3$	2. $2 + \frac{u}{5} = 6$	3. $5 + \frac{z}{6} = 12$	4. $10 + \frac{v}{6} = 16$
5. $\frac{v}{6} - 1 = 3$	6. $8 - \frac{a}{9} = 5$	7. $7 + \frac{z}{4} = 9$	8. $4 + \frac{x}{4} = 9$
9. $2 + \frac{v}{8} = 11$	10. $2 + \frac{u}{2} = 5$	11. $\frac{y}{2} + 4 = 6$	12. $8 + \frac{z}{9} = 11$

Express each repeating decimal as a fraction. Show your work.

13 $0.0\overline{45}$



Lesson Check –#1 Tell whether each equation has one solution, no solution or infinite number of solutions.