

- 1) Bell Ringer: page 49
- 2) Go over homework pages 47-48
- 3) Lesson: Equations with infinite or no solution
- 4) Homework: page 58 (*p.62 - 63 - Friday  
work 1-15*)

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**WARM-UP***Solve the equations.*

1)  $9x = 2x - 84$

$$\begin{array}{rcl} -2x & & -2x \\ \hline 7x & = & -84 \\ \hline x & = & -12 \end{array}$$

2)  $\cancel{-x + 5x - 14} = 3x - 59$

$$\begin{array}{rcl} -6x - 14 & = & 3x - 59 \\ \hline -3x & & -3x \\ \hline -9x - 14 & = & -59 \\ \cancel{-14} & & \cancel{+14} \\ \hline -9x & = & -45 \\ \hline -9 & & -9 \\ x & = & 5 \end{array}$$

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# One, Infinite, or No Solutions

P. 50

Does every equation have one solution? No

$$\cancel{3x} - 8 = \cancel{3x} - 8$$

$$-8 = -8 \quad \text{identity}$$

infinite solutions

check

$$3(9) - 8 = 3(9) - 8$$

$$27 - 8 = 27 - 8$$

$$19 = 19 \checkmark$$

check

$$3(5) - 8 = 3(5) - 8$$

$$15 - 8 = 15 - 8$$

$$7 = 7 \checkmark$$

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x w/ same coefficient

## NOTES

When x is on both sides, the equation may have no solution, or an infinite amount of solutions. Trying to solve an equation with no solution produces an equation that isn't true.

### Examples

Solve the equations.

$$\cancel{4x} + 18 = \cancel{4x} + 5$$

$18 \neq 5$   
no solution

$$\underbrace{-5x - x + 7}_{-6x + 7} = \underbrace{-6x + 2}_{+6x}$$

$7 \neq 2$   
no solution

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## NOTES

Trying to solve an equation with infinite solutions produces an equation that is true for all values of x. This is called an identity.

### Examples

Solve the equations.

$$\begin{array}{rcl} 5x + 8 & = & 5x + 8 \\ -5x & & -5x \\ \hline 8 & = & 8 \\ \text{infinite solutions} & & \end{array}$$

$$\begin{array}{rcl} 3x - 14 - 2 & = & 8x - 5x - 16 \\ -3x & & -3x \\ \hline -16 & = & -16 \\ \text{infinite solutions} & & \end{array}$$

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## EXAMPLES

✓ Solve the equations. State if the equation has one, no, or infinite solutions.

$$\begin{array}{rcl} -5x - 13 & = & x + 29 \\ +5x & & +5x \\ \hline -13 & = & 6x + 29 \\ -29 & & -29 \\ \hline -42 & = & 6x \\ -7 & = & x \\ \text{(solution)} & & \end{array}$$

check

$$\begin{array}{l} -5(-7) - 13 = -7 + 29 \\ 35 - 13 = 22 \\ 22 \quad \checkmark \end{array}$$

$$\begin{array}{rcl} -2x + 15 + x & = & -x + 7 + 9 \\ -1x + 15 & = & -x + 16 \\ +x & & +x \\ \hline 15 & \neq & 16 \end{array}$$

No solution

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## NOTES

A solution of  $x = 0$ , is still one solution.

### Examples

- 1) Solve the equations. 2) State if the equation has one, no, or infinite solutions.

$$\begin{array}{rcl} 5x - 13 & = & x - 13 \\ -x & & \cancel{x} \\ \hline 4x - 13 & = & -13 \\ +13 & & +13 \\ \hline 4x & = & 0 \\ \frac{4}{4} & & \cancel{4} \\ x & = & 0 \end{array}$$

( Solution )

### Check

$$\begin{aligned} 5x - 13 &= x - 13 \\ 5(0) - 13 &= 0 - 13 \\ 0 - 13 &= 0 - 13 \\ -13 &= -13 \checkmark \end{aligned}$$

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## NOTES

If an equation has parentheses we usually do distributive property first.

### Examples

- Solve the equations. State if the equation has one, no, or infinite solutions.

$$\begin{array}{rcl} 5(x - 2) & = & 3x + 18 \\ 5x - 10 & = & 3x + 18 \\ -3x & & \cancel{-3x} \\ \hline 2x - 10 & = & 18 \\ +10 & & +10 \\ \hline 2x & = & 28 \\ \frac{2}{2} & & \cancel{2} \\ x & = & 14 \end{array}$$

one solution

$$\begin{array}{rcl} 2(x - 6) + x & = & 3x - 12 \\ 2x - 12 + x & = & 3x - 12 \\ \cancel{2x} & & \cancel{3x} \\ \hline -12 & = & -12 \checkmark \\ & & \text{infinite solutions} \end{array}$$

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## PRACTICE

Solve the equations. State if the equation has one, no, or infinite solutions.

$$7x + 9 - 2x = 5x - 6 + 15$$

$$2(-5x + 7) = -10x + 12$$

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## FINAL QUESTION

Solve the equation. State if the equation has one, no, or infinite solutions.

$$-9x + 30 = 2(x - 1) + 32$$

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Math 8 Unit 1 1.5 Assignment

Equations with Infinite and No Solutions

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Solve each equation.

1)  $6x + 3 - 6x = 3$

2)  $0 = -4p + 4p$

3)  $1 = 5 + p - p$

4)  $a - a = -5$

5)  $0 = 4x - 4x$

6)  $7 = 6 - 4r + 4r$

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