Name Key
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Date _____
Math 8R

Solving Systems of Equations Algebraically Day I

**when both equations are y = **

I. Definition: A system of equations is a set of two or more equations that contain two or more different variables.

II. When solving systems of equations, remember to find the values for both of the variables.

III. Steps:
1. Make sure that both equations are = to the same variable.
2. Set the expressions equal to each other (using the Transitive Property)
3. Solve the equation for the remaining variable. (use DCMS)
4. Substitute your answer (from step 3) into either original equation to solve for the other missing variable (make sure to use parentheses)
5. Do 2 checks

IV. Ex's: Solve the following systems algebraically and check.

1. $y = x + 3$
   $y = 2x + 5$

$x + 3 = 2x + 5$
$-x \quad -x$
$3 = x + 5$
$-5 \quad -5$
$-2 = x$
$x = -2$

$y = x + 3$
$y = (-2) + 3$
$y = 1$

$(-2, 1)$

Check #1
$(-2, 1)$
$x \; y$
$y = x + 3$
$1 = (-2) + 3$
$1 = 1$ ✓

Check #2
$(-2, 1)$
$x \; y$
$y = 2x + 5$
$1 = 2(-2) + 5$
$1 = -4 + 5$
$1 = 1$ ✓

D C M S

2. $y = -2x + 3$
$y = 5x - 4$

$-2x + 3 = 5x - 4$
$+2x \qquad +2x$
$3 = 7x - 4$
$+4 \qquad +4$
$7 = 7x$
$\frac{7}{7} = \frac{7x}{7}$
$1 = x$
$x = 1$

$y = -2x + 3$
$y = -2(1) + 3$
$y = -2 + 3$
$y = 1$
$(1, 1)$

Check #1
$(1, 1)$
$y = -2x + 3$
$1 = -2(1) + 3$
$1 = -2 + 3$
$1 = 1$ ✓

Check #2
$(1, 1)$
$y = 5x - 4$
$1 = 5(1) - 4$
$1 = 5 - 4$
$1 = 1$ ✓

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3. $y = 5x + 7$
$y = -3x + 7$

$5x + 7 = -3x + 7$
$+3x \qquad +3x$
$8x + 7 = 7$
$-7 \quad -7$
$8x = 0$
$\frac{8x}{8} = \frac{0}{8}$
$x = 0$

$y = 5x + 7$
$y = 5(0) + 7$
$y = 0 + 7$
$y = 7$
$(0, 7)$

Check #1
$(0, 7)$
$x \quad y$
$y = 5x + 7$
$7 = 5(0) + 7$
$7 = 0 + 7$
$7 = 7$ ✓

Check #2
$(0, 7)$
$x \quad y$
$y = -3x + 7$
$7 = -3(0) + 7$
$7 = 0 + 7$
$7 = 7$ ✓

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4. $y = 3x - 5$
$y = 6x + 7$

$3x - 5 = 6x + 7$
$-3x \qquad -3x$
$-5 = 3x + 7$
$-7 \qquad -7$
$-12 = 3x$
$\frac{-12}{3} = \frac{3x}{3}$
$-4 = x$
$x = -4$

$y = 3x - 5$
$y = 3(-4) - 5$
$y = -12 - 5$
$y = -17$
$(-4, -17)$

Check #1
$(-4, -17)$
$y = 3x - 5$
$-17 = 3(-4) - 5$
$-17 = -12 - 5$
$-17 = -17$ ✓

Check #2
$(-4, -17)$
$y = 6x + 7$
$-17 = 6(-4) + 7$
$-17 = -24 + 7$
$-17 = -17$ ✓