

# INDEPENDENT VARIABLE

## IDV WORKSHEETS



# SOLVING SYSTEMS BY SETTING EQUAL

SET THE RIGHT SIDES EQUAL | SOLVE | FIND THE POINT

ANIMATED  
POWERPOINT:  
DOES THE WORK  
FOR YOU!

FULL ANSWER  
KEYS  
INCLUDED

### PROBLEM 2 • GUIDED PROBLEMS: SETTING EQUAL

#### Solve by Setting Them Equal

$y = 3x - 1$  and  $y = 4x - 3$ : set them equal.

$$3x - 1 = 4x - 3$$

$$3x \quad -3x$$

$$-1 = x - 3$$

$$+3 \quad +3$$

$$2 = x$$

**INVERSE 1** Get rid of the smallest variable term,  $3x$  from both sides.

**REWRITE** Rewrite the equation:  $-1 = x - 3$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable,  $-3$ : add 3 to both sides.

**REWRITE** Rewrite the equation:  $2 = x$ .

### GUIDED PROBLEM 5 • GUIDED PROBLEMS: SETTING EQUAL

#### Solve by Setting Them Equal

$y = -5x + 6$  and  $y = -6x + 9$ : set them equal.

$$-5x + 6 = -6x + 9$$

$$+6x \quad +6x$$

$$x + 6 = 9$$

$$-6 \quad -6$$

$$x = 3$$

**INVERSE 1** Get rid of the smallest variable term,  $-6x$ : add  $6x$  to both sides.

**REWRITE** Rewrite the equation:  $x + 6 = 9$ . Now it is a one-step equation.

**INVERSE 2** Get rid of the number by the variable,  $6$ : subtract 6 from both sides.

**REWRITE** Rewrite the equation:  $x = 3$ .

6 EXAMPLE  
PROBLEMS  
4 PRACTICE  
SHEETS

LEVELED  
PRACTICE +  
FIND THE  
MISTAKE

MORE PRACTICE. LESS PREP. BETTER OUTCOMES.

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# Inside the Animated Lesson

## INDEPENDENT VARIABLE

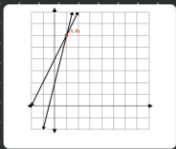
GRADE 8 • SYSTEMS OF EQUATIONS

# SYSTEMS BY SETTING EQUATIONS EQUAL

$y = y$  | SOLVE FOR  $x$  | THEN FIND  $y$

**Animated PowerPoint lesson**  
6 animated systems, every step  
Practice A, B, C • Find the Mistake

**MORE PRACTICE, LESS PREP, BETTER OUTCOMES.**  
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### LESSON OVERVIEW

## Today's Goals

I CAN...

- Solve a system by setting the two expressions for  $y$  equal.
- Solve the equation for  $x$ , then find  $y$ .
- Write the solution as a point  $(x, y)$  and check it in both equations.

**STANDARDS**  
CCSS 8.EE.C.8b CCSS 8.EE.C.10

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### KEY VOCABULARY

|                                                                    |                                                               |
|--------------------------------------------------------------------|---------------------------------------------------------------|
| <b>System</b><br>two equations, same $x$ and $y$                   | <b>Set equal</b><br>both equal $y$ , so they equal each other |
| <b>Smallest variable term</b><br>the $x$ term you get rid of first | <b>Solution</b><br>the point $(x, y)$ where the lines cross   |
| <b>Substitute</b><br>put the number in for $x$                     | <b>Check</b><br>the point works in BOTH equations             |

### GUIDED PROBLEM 2 • GUIDED PROBLEMS: SETTING EQUAL

## Solve by Setting Them Equal

$y = 3x - 1$  and  $y = 4x - 3$ : set them equal.

YOUR TURN FIRST

**STEP 1 GOAL:** get the variables on ONE side. Then it is a two-step equation.

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### GUIDED PROBLEM 2 • GUIDED PROBLEMS: SETTING EQUAL

## Solve by Setting Them Equal

$y = 3x - 1$  and  $y = 4x - 3$ : set them equal.

$$3x - 1 = 4x - 3$$

$$\begin{array}{r} -3x \quad -3x \\ -1 = x - 3 \\ +3 \quad +3 \\ 2 = x \end{array}$$

**INVERSE 1** Get rid of the smallest variable term,  $3x$ : subtract  $3x$  from both sides.

**REWRITE** Rewrite the equation:  $-1 = x - 3$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable,  $-3$ : add 3 to both sides.

**REWRITE** Rewrite the equation:  $2 = x$ .

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### GUIDED PROBLEM 2 • GUIDED PROBLEMS: SETTING EQUAL

## Solve by Setting Them Equal

$y = 3x - 1$  and  $y = 4x - 3$ : set them equal.

$$3x - 1 = 4x - 3$$

$$\begin{array}{r} -3x \quad -3x \\ -1 = x - 3 \\ +3 \quad +3 \\ 2 = x \end{array}$$

**INVERSE 1** Get rid of the smallest variable term,  $3x$ : subtract  $3x$  from both sides.

**REWRITE** Rewrite the equation:  $-1 = x - 3$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable,  $-3$ : add 3 to both sides.

**REWRITE** Rewrite the equation:  $2 = x$ .

**FIND  $y$**  Find  $y$ : put  $x = 2$  into the first equation. Write the point  $(x, y)$ .

$y = 3(2) - 1 = 5$   
**Solution:**  $(2, 5)$

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### GUIDED PROBLEM 4 • GUIDED PROBLEMS: SETTING EQUAL

## Solve by Setting Them Equal

$y = 2x - 8$  and  $y = -2x + 8$ : set them equal.

$$2x - 8 = -2x + 8$$

$$\begin{array}{r} +2x \quad +2x \\ 4x - 8 = 8 \\ +8 \quad +8 \\ 4x = 16 \\ \frac{4}{4} \quad \frac{16}{4} \\ x = 4 \end{array}$$

**INVERSE 1** Get rid of the smallest variable term,  $-2x$ : add  $2x$  to both sides.

**REWRITE** Rewrite the equation:  $4x - 8 = 8$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable,  $-8$ : add 8 to both sides.

**REWRITE** Rewrite the equation:  $4x = 16$ .

**INVERSE 3** Isolate  $x$ : it is multiplied by 4, so divide both sides by 4.

**REWRITE** Rewrite:  $x = 4$ .

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### GUIDED PROBLEM 5 • GUIDED PROBLEMS: SETTING EQUAL

## Solve by Setting Them Equal

$y = -5x + 6$  and  $y = -6x + 9$ : set them equal.

$$-5x + 6 = -6x + 9$$

$$\begin{array}{r} +6x \quad +6x \\ x + 6 = 9 \\ -6 \quad -6 \\ x = 3 \end{array}$$

**INVERSE 1** Get rid of the smallest variable term,  $-6x$ : add  $6x$  to both sides.

**REWRITE** Rewrite the equation:  $x + 6 = 9$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable, 6: subtract 6 from both sides.

**REWRITE** Rewrite the equation:  $x = 3$ .

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### GUIDED PROBLEM 6 • GUIDED PROBLEMS: SETTING EQUAL • CHALLENGE

## Solve by Setting Them Equal

$y = -5x + 10$  and  $y = 5x + 5$ : set them equal.

$$-5x + 10 = 5x + 5$$

$$\begin{array}{r} +5x \quad +5x \\ 10 = 10x + 5 \\ -5 \quad -5 \\ 5 = 10x \\ \frac{5}{10} \quad \frac{10}{10} \\ \frac{1}{2} = x \end{array}$$

**INVERSE 1** Get rid of the smallest variable term,  $-5x$ : add  $5x$  to both sides.

**REWRITE** Rewrite the equation:  $10 = 10x + 5$ . Now it is a two-step equation.

**INVERSE 2** Get rid of the number by the variable, 5: subtract 5 from both sides.

**REWRITE** Rewrite the equation:  $5 = 10x$ .

**INVERSE 3** Isolate  $x$ : it is multiplied by 10, so divide both sides by 10.

**REWRITE** Rewrite:  $1/2 = x$ . Reduce if you can.

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Directions: Fill in the notes. Copy each system into its box when it is shown, and solve it.

NOTES

Both equations say what y is, so set the two right sides \_\_\_\_\_.

Solve for x: get rid of the \_\_\_\_\_ first, then the number by x, then divide.

Put x into the first equation to find \_\_\_\_\_. Write the solution as the point \_\_\_\_\_.

GUIDED PROBLEMS

|    |    |              |
|----|----|--------------|
| 1. | 2. | 3.           |
| 4. | 5. | 6. CHALLENGE |

Name \_\_\_\_\_ Per \_\_\_\_\_

## Practice A: Getting Started

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**Directions:** Solve each system by setting the equations equal. Write the solution as (x, y).

|                                                         |                                                         |                                                          |
|---------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------|
| 1. $\begin{cases} y = 4x - 7 \\ y = 2x - 1 \end{cases}$ | 2. $\begin{cases} y = x + 5 \\ y = 3x - 9 \end{cases}$  | 3. $\begin{cases} y = 2x - 7 \\ y = x - 2 \end{cases}$   |
| 4. $\begin{cases} y = 3x + 5 \\ y = 4x + 3 \end{cases}$ | 5. $\begin{cases} y = x + 5 \\ y = 4x - 7 \end{cases}$  | 6. $\begin{cases} y = x + 4 \\ y = 5x - 4 \end{cases}$   |
| 7. $\begin{cases} y = 4x - 2 \\ y = x + 1 \end{cases}$  | 8. $\begin{cases} y = x + 7 \\ y = 4x - 2 \end{cases}$  | 9. $\begin{cases} y = 3x + 9 \\ y = 2x + 10 \end{cases}$ |
| 10. $\begin{cases} y = 2x - 3 \\ y = x + 2 \end{cases}$ | 11. $\begin{cases} y = x - 1 \\ y = 2x - 7 \end{cases}$ | 12. $\begin{cases} y = x + 2 \\ y = 2x - 2 \end{cases}$  |

**Directions:** Solve each system by setting the equations equal. Write the solution as (x, y).

|                                                            |                                                           |                                                          |
|------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------|
| 1. $\begin{cases} y = -4x + 2 \\ y = 2x - 4 \end{cases}$   | 2. $\begin{cases} y = -2x - 2 \\ y = -4x + 2 \end{cases}$ | 3. $\begin{cases} y = -2x + 11 \\ y = x + 2 \end{cases}$ |
| 4. $\begin{cases} y = -4x - 8 \\ y = -x - 5 \end{cases}$   | 5. $\begin{cases} y = -2x - 5 \\ y = x + 7 \end{cases}$   | 6. $\begin{cases} y = -3x + 1 \\ y = 3x + 7 \end{cases}$ |
| 7. $\begin{cases} y = -5x + 2 \\ y = -x - 2 \end{cases}$   | 8. $\begin{cases} y = x - 2 \\ y = 4x - 2 \end{cases}$    | 9. $\begin{cases} y = -2x - 4 \\ y = -x + 2 \end{cases}$ |
| 10. $\begin{cases} y = -x - 4 \\ y = -5x + 12 \end{cases}$ | 11. $\begin{cases} y = 5x + 9 \\ y = x - 3 \end{cases}$   | 12. $\begin{cases} y = -2x - 3 \\ y = x + 9 \end{cases}$ |

**Directions:** Each student made ONE mistake. Circle the first wrong line, explain it, and fix it.

|                                                                                                                                                                                             |                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. <i>Kai's work:</i></p> $\begin{cases} y = 3x + 1 \\ y = x + 7 \end{cases}$ $3x + 1 = x + 7$ $2x + 1 = 7$ $2x = 6$ $x = 3$ <p>Solution: <math>x = 3</math></p> <hr/> <hr/> <hr/> <hr/> | <p>2. <i>Rosa's work:</i></p> $\begin{cases} y = 2x + 5 \\ y = -x + 11 \end{cases}$ $2x + 5 = -x + 11$ $x + 5 = 11$ $x = 6$ $y = 2(6) + 5 = 17$ $(6, 17)$ <hr/> <hr/> <hr/> <hr/>           |
| <p>3. <i>Theo's work:</i></p> $\begin{cases} y = 5x - 4 \\ y = 3x + 2 \end{cases}$ $5x - 4 = 3x + 2$ $2x - 4 = 2$ $2x = -2$ $x = -1$ $(-1, -9)$ <hr/> <hr/> <hr/> <hr/>                     | <p>4. <i>Mia's work:</i></p> $\begin{cases} y = -2x + 1 \\ y = x - 8 \end{cases}$ $-2x + 1 = x - 8$ $1 = 3x - 8$ $9 = 3x$ $x = 3$ $(-5, 3)$ <hr/> <hr/> <hr/> <hr/>                         |
| <p>5. <i>Owen's work:</i></p> $\begin{cases} y = 6x + 1 \\ y = 2x + 3 \end{cases}$ $6x + 1 = 2x + 3$ $4x + 1 = 3$ $4x = 2$ $x = 2$ $(2, 13)$ <hr/> <hr/> <hr/> <hr/>                        | <p>6. <i>Ana's work:</i></p> $\begin{cases} y = -3x + 4 \\ y = 2x - 6 \end{cases}$ $-3x + 4 = 2x - 6$ $4 = 5x - 6$ $10 = 5x$ $x = 2$ $y = -3(2) + 4 = 10$ $(2, 10)$ <hr/> <hr/> <hr/> <hr/> |