

INDEPENDENT VARIABLE

IDV WORKSHEETS



MULTI-STEP HANGER DIAGRAMS

VARIABLES ON BOTH SIDES | ZERO PAIRS | NEGATIVES

ANIMATED
POWERPOINT:
DOES THE WORK
FOR YOU!

FULL ANSWER
KEYS
INCLUDED

15 EXAMPLE
PROBLEMS
& PRACTICE
SHEETS

PRACTICE BY
PART, PUT IT
TOGETHER +
FIND THE
MISTAKE

MORE PRACTICE. LESS PREP. BETTER OUTCOMES.

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Inside the Animated Lesson

INDEPENDENT VARIABLE

GRADE 7-8 • SOLVING EQUATIONS

MULTI-STEP HANGER DIAGRAMS

VARIABLES ON BOTH SIDES | ZERO PAIRS | NEGATIVES

Animated PowerPoint lesson
 9 animated hangers, every move shown
 4 practice sheets • Find the Mistake

MORE PRACTICE. LESS PREP. BETTER OUTCOMES.
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LESSON OVERVIEW

Today's Goals

I CAN...

- Write the equation a hanger shows.
- Solve it with zero pairs and the smallest x.
- Show every move on the hanger and in the equation.

KEY VOCABULARY

Hanger both sides weigh the same	Zero pair a white and a black of the same shape: 0
Like terms x's with x's, numbers with numbers	Black shape a negative number or -x
Smallest x -2x is smaller than x	Equal share divide: each x gets the same

STANDARDS
 CCSS 8.EE.C.7b CCSS 7.EE.B.4a

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PART 1 • NOTES

Variables on Both Sides

NOTES • GUIDED PROBLEMS: PARTS 1 AND 2

Step 1: get rid of the **smallest x**. Take it off **both sides**.

Step 2: get rid of the **number by x**. Take it off both sides.

Final step: **divide** both sides by how many x's there are.

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PART 1 • GUIDED PROBLEM 1 • GUIDED PROBLEMS: PARTS 1 AND 2

Solve the Hanger

STEP 1: SMALLEST x

Write the equation.

$$2x + 8 = x + 12$$

-x -x

$$x + 8 = 12$$

Get rid of the smallest variable term, x: subtract x from both sides.

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PART 1 • GUIDED PROBLEM 1 • GUIDED PROBLEMS: PARTS 1 AND 2

Solve the Hanger

STEP 1: SMALLEST x

Write the equation.

$$2x + 8 = x + 12$$

-x -x

$$x + 8 = 12$$

-8 -8

$$x = 4$$

Get rid of the smallest variable term, x: subtract x from both sides.

Get rid of the number by the variable, 8: subtract 8 from both sides.

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PART 2 • NOTES

Combine Like Terms First

NOTES • GUIDED PROBLEMS: PARTS 1 AND 2

A black shape is **negative**.

A white and a black of the same shape are a **zero pair**. They cancel.

Step 0: **combine like terms** first.

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PART 2 • GUIDED PROBLEM 4 • GUIDED PROBLEMS: PARTS 1 AND 2

Solve the Hanger

STEP 1: SMALLEST x

Write the equation.

$$2x - 4 + 4 = x - 4 + 12$$

$$2x = x + 8$$

-x -x

$$x = 8$$

Combine like terms: zero pairs cancel.

Get rid of the smallest variable term, x: subtract x from both sides.

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PART 4 • GUIDED PROBLEM 8 • GUIDED PROBLEMS: PARTS 3 AND 4

Solve the Hanger

STEP 1: SMALLEST x

Write the equation.

$$-2x - 9 = x + 12$$

+2x +2x

$$-9 = 3x + 12$$

-12 -12

$$-21 = 3x$$

+3 +3

$$-7 = x$$

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

Get rid of the number by the variable, 12: subtract 12 from both sides.

Divide both sides by 3: each x gets an equal share.

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Directions: Fill in the notes. Write the equation for each hanger and solve it with the slides.

NOTES

Step 1: get rid of the _____. Take it off _____.

Step 2: get rid of the _____. Take it off both sides.

Final step: _____ both sides by how many x's there are.

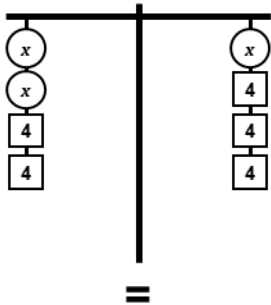
A black shape is _____.

A white and a black of the same shape are a _____. They cancel.

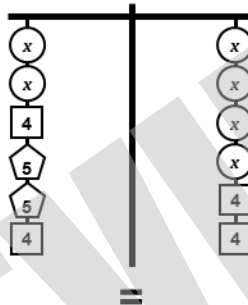
Step 0: _____ first.

PART 1: VARIABLES ON BOTH SIDES

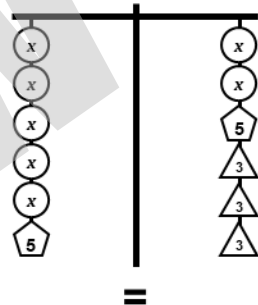
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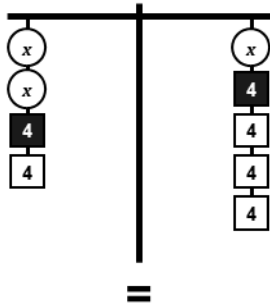


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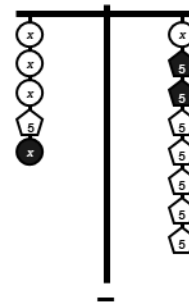


PART 2: COMBINE LIKE TERMS FIRST

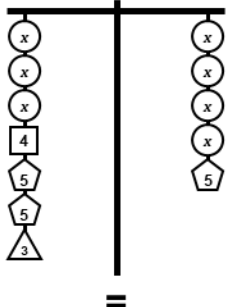
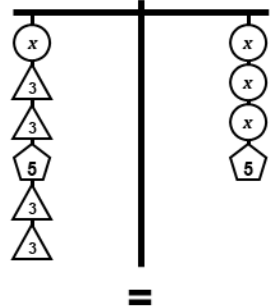
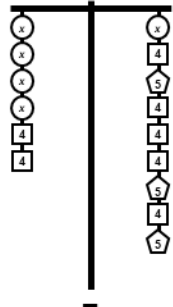
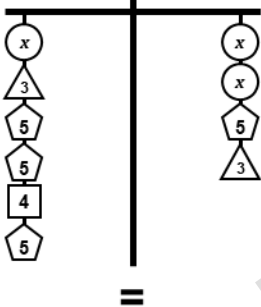
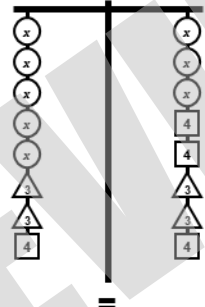
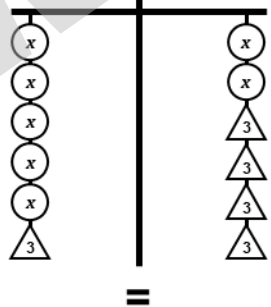
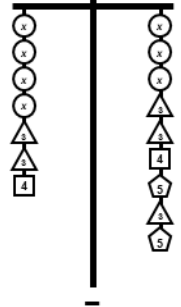
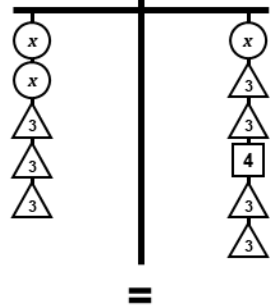
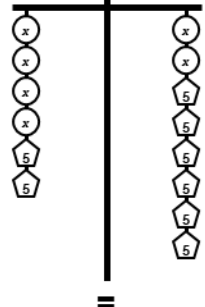
4.



5.



Directions: Write the equation for each hanger. Solve it: show your work on the hanger and in the equation.

1.  =	2.  =	3.  =
4.  =	5.  =	6.  =
7.  =	8.  =	9.  =

Directions: Fill in the notes. Write the equation for each hanger and solve it with the slides.

NOTES

Can't take it off? _____ the opposite to both sides.

-4 and 4 are a zero pair: they make _____.

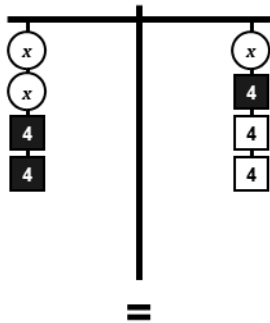
$-2x$ is _____ than x .

Get rid of $-2x$: _____ to both sides.

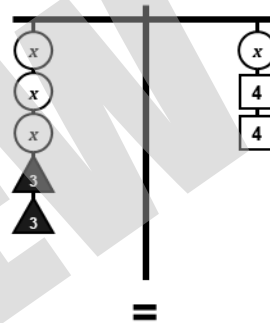
The x 's left are _____. Never divide by a negative.

PART 3: A NEGATIVE NUMBER BY X

6.

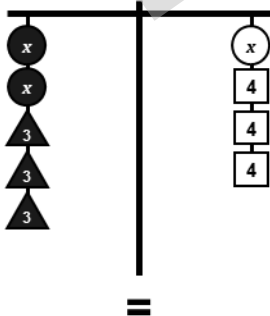


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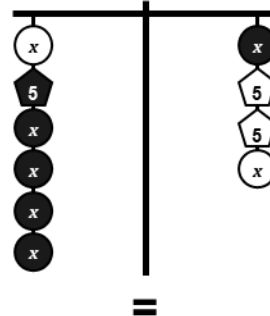


PART 4: NEGATIVE X'S

8.



9.



Directions: Fill in the notes. Write the equation for each hanger and solve it.

NOTES

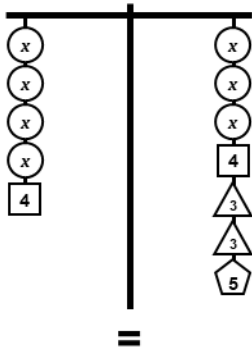
Step 0: zero pairs _____.

Step 1: get rid of the _____.

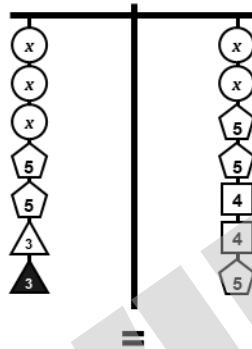
Step 2: get rid of the _____.

Final step: _____.

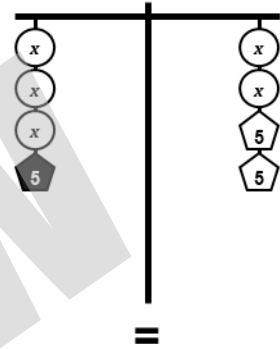
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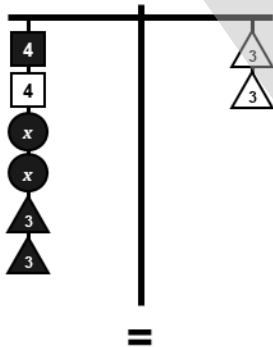
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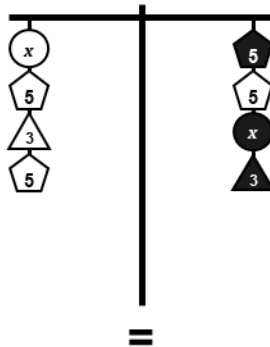
3.



4.



5.



6.

CHALLENGE

