

Warm Up:Evaluate each expression for $x = -2$.

1. $3x - 5$

2. $-\frac{x}{2} + 3$

3. $-5x^2 + 1$

4. $4 - 8x^3$

Speak Like A Mathematician:identity:**Example 1: Solving Equations with Variables on Both Sides**

$$5 + 7a = 4a - 13$$

$$2m - 13 = -8m + 27$$

$$9x - 4 = 2x + 3$$

$$6 + 3t = 8t - 14$$

$$7c + 12 = -4c + 78$$

$$5d = 2d - 13$$

Mr. Nappier's Easy-Button Equation Rules:

1. Think OUTSIDE the box.
2. Equations MUST remain equal.
3. Opposites make ZERO.
4. Quick Check with Substitution.
5. Side by Side? You must DIVIDE.

Example 2: Writing Equations with Variables on Both Sides

- In the 2015 Nathan's Hot Dog Eating Contest, Matt, the men's champion, ate 62 hot dogs in 10 minutes. The winner on the women's side, Miki, ate 38 hot dogs in 10 minutes. Since they were both winners, Matt and Miki decide to compete against each other. To make things more interesting, Matt has agreed not to start until Miki has already eaten 20 hot dogs.

Assume that Matt and Miki eat at a constant rate throughout the competition. Based on the number of hotdogs eaten in 10 minutes by both contestants, how many minutes after Matt starts eating will they have eaten the same number of hotdogs?

Example 3 & 4: Solve an Equation with Grouping Symbols or Fraction Bar

$$7(n - 1) = -2(3 + n)$$

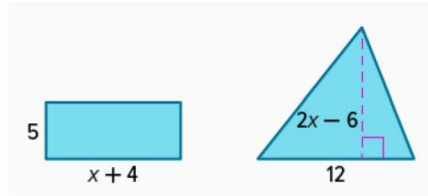
$$7(n - 2) + 8 = 3(n - 4) - 2$$

$$5y = \frac{12y+16}{4}$$

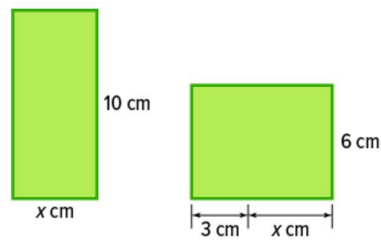
$$\frac{b-4}{6} = \frac{b}{2}$$

Example 5: Write an Equation with Grouping Symbols

- Find the value of x so that the figures have the same area.



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**Identities and Equations with No Solutions**

$$6(y - 5) = 2(10 + 3y)$$

$$7x + 5(x - 1) = 12x - 5$$

$$8(g + 6) = 5g + 3(g + 16)$$

$$3(2b - 1) - 7 = 6b - 10$$