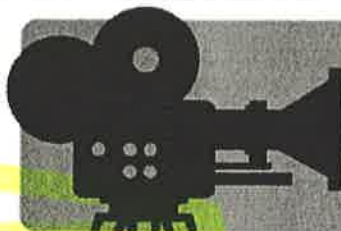


# Topic 1.3 – Solving Equations with a Variable on Both Sides

## Explore & Reason

Some friends want to see a movie that is showing at two different theaters in town. They plan to share three tubs of popcorn during the movie.



	Theater A	Theater B
Ticket Price	\$14.50	\$13.00
Popcorn	\$5.75	\$6.75

A. Which movie theater should the friends choose? Explain.

B. For what situation would the total cost at each theater be exactly the same? Explain.

C. There are different methods to solving this problem. Which do you think is the best? Why?

### EXAMPLE 1 Solving Equations With a Variable on Both Sides

A. What is the value of x in the equation shown?

$$3x - 10 + 4x = -2(x - 4) + 9$$

$$3x - 10 + 4x = -2x + 8 + 9$$

$$7x - 10 = -2x + 8 + 9$$

$$7x - 10 = -2x + 17$$

$$\frac{1}{2}(n - 4) - 7 = -2n + 6$$

$$0.5n - 2 - 7 = -2n + 6$$

$$0.5n - 9 = -2n + 6$$

$$0.5n = -2n + 15$$

$$7x = -2x + 27$$

$$9x = 27$$

$$x = 3$$

$$2.5n = 15$$

$$n = 6$$

B. What is the value of n in the equation shown?

### EXAMPLE 2 Understand Equations With Infinitely Many or No Solutions

A. What is the value of x in  $4x + 6 = 2(2x + 3)$

$$4x + 6 = 4x + 6$$

$$6 = 6$$

Same equation on both sides  
true statement

\* Infinite Solutions

B. What is the value of x in  $6x - 5 = 2(3x + 4)$

$$6x - 5 = 6x + 8$$

$$-5 \neq 8$$

False statement

No Solution