Section 5.3: Adding and Subtracting Polynomials

Learning Targets - day 4:

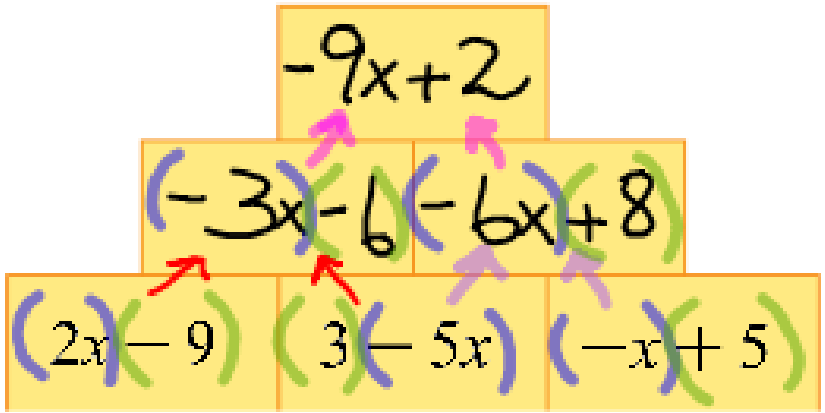
1. Complete polynomial addition and subtraction puzzles.

2. Apply polynomial addition and subtraction to perimeters of geometric shapes.

3. Use polynomials to model real-world situations to solve problems.

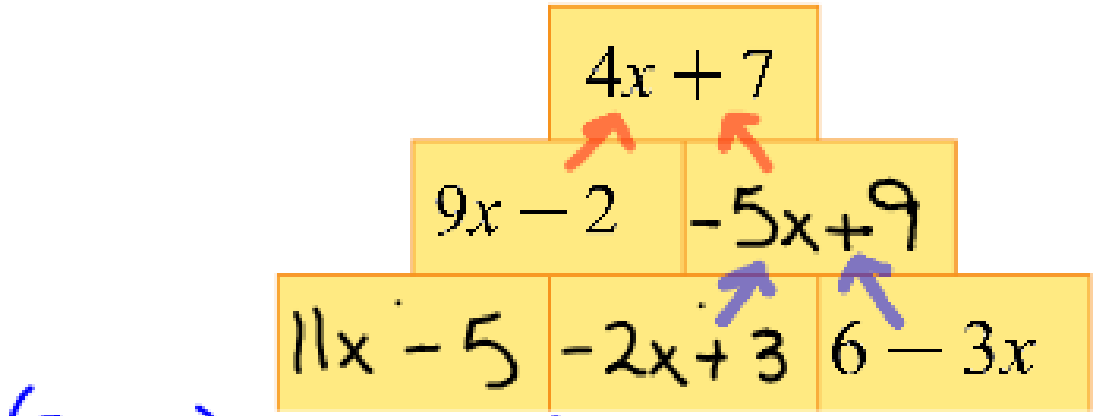
Polynomial Puzzle #1:

Complete the addition pyramid. Find the value in any box by adding the expressions in the two boxes immediately below it.



Polynomial Puzzle #2:

Complete the addition pyramid. Find the value in any box by adding the expressions in the two boxes immediately below it.



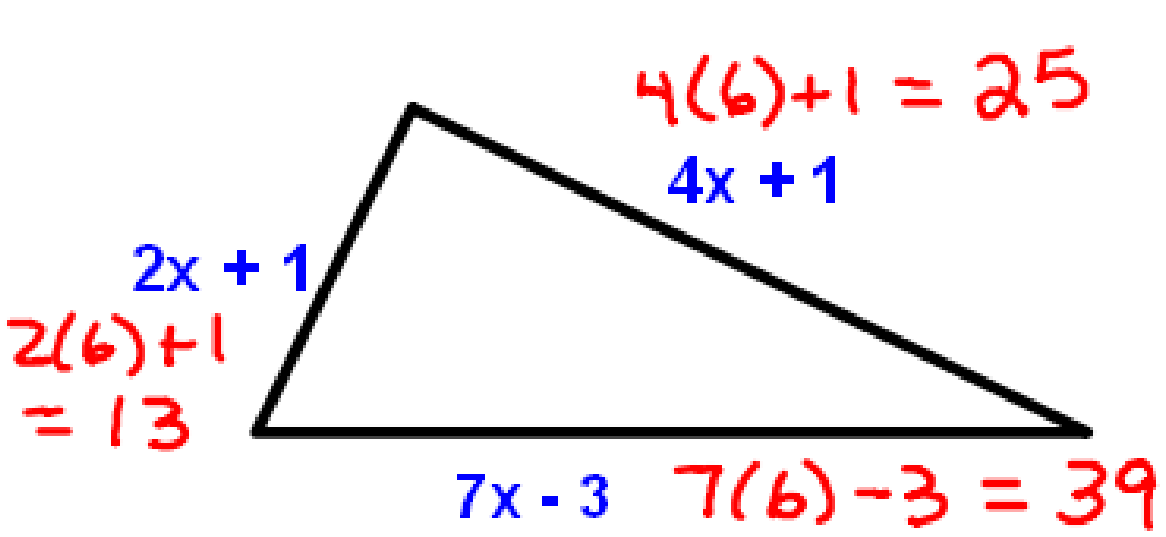
$(4x+7) - (9x-2)$
$+(-9x+2)$
$= -5x + 9$

$(-5x+9) - (6-3x)$
$+(-6+3x)$

$(9x-2) - (-2x+3)$
$+(2x-3)$

Example:

A triangle has side lengths represented by binomials as shown in the drawing.



Check:

25 + 39 + 13

= 77 ✓

a) Write the polynomial addition expression to represent the **perimeter** of the triangle.

Perimeter = (4x+1) + (2x+1) + (7x-3)

b) **Simplify** the expression from part a)

Perimeter $= 4x+1 + 2x+1 + 7x-3$

$= 13x - 1$

c) If **x has a value of 6**, what is the perimeter of the triangle? Use your expression from part b)

Substitute $x = 6$ into $13x - 1$

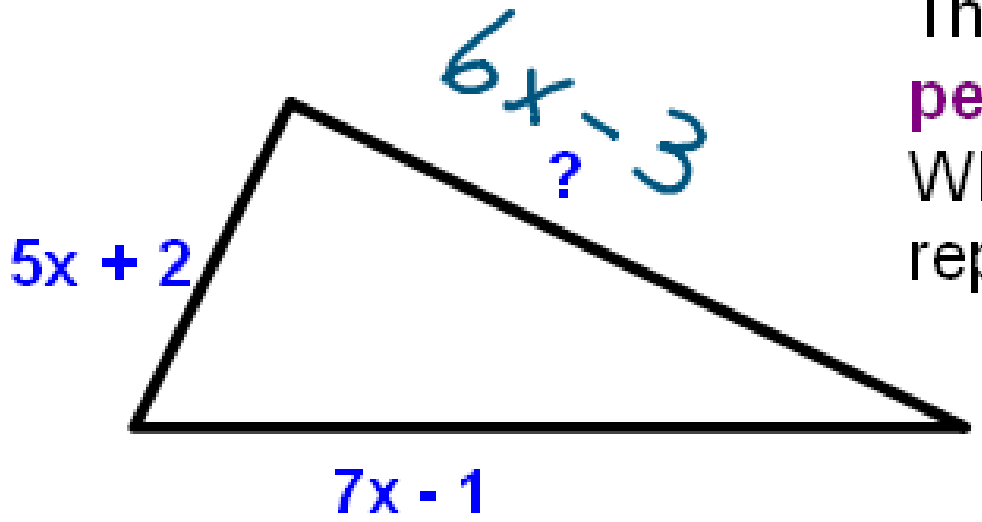
Perimeter $= 13(6) - 1$

$= 78 - 1$

$= 77$

Example:

A triangle has side lengths represented by binomials as shown in the drawing.



This polynomial has a **perimeter of 18x - 2** . What expression would represent the missing side?

$(5x+2)+(7x-1)$

$=5x+2+7x-1$

$=12x+1$

$(18x-2)-(12x+1)$

$=+(-12x-1)$

$=18x-2-12x-1$

$=6x-3$

Example:

A rectangle has a width of **n + 5 cm** and a length of **3n - 2 cm.**

a) Sketch a rectangle and label its length and width using the polynomial expressions.

Example:

A rectangle has a width of **n + 5 cm** and a length of **3n - 2 cm.**

b) What polynomial expression would represent the **perimeter** of the rectangle? Simplify the perimeter by combining like terms.

$$\text{Perimeter} = (3n-2)+(n+5)+(3n-2)+(n+5)$$

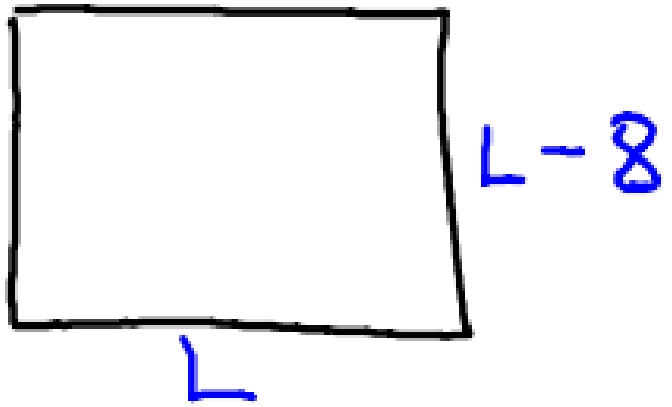
$$= 3n-2+n+5+3n-2+n+5$$

$$= 8n+6 \text{ cm}$$

Example:

A rectangle has a width that is 8 cm shorter than its length.

a) Sketch a rectangle and label its length as L



b) What polynomial expression would represent the width of the rectangle? Add this to the diagram.

Example:

A rectangle has a width that is 8 cm shorter than its length.

c) What polynomial would represent the perimeter of the rectangle? Simplify by combining like terms.

$$\text{Perimeter} = L + L - 8 + L + L - 8$$

$$= 4L - 16$$

Example:

The cost of an engraveable wooden plaque is $20. It costs $0.25 per letter to engrave a message on the plaque.

a) Calculate the cost of a plaque with the following engraving: *Thank you for your generous support*

$\$20 + 0.25(30) = \$20 + 7.5 = \$27.50$

b) Write a polynomial expression that would represent the cost of purchasing a plaque with an unknown number of letters.

Let n represent the # of letters

$20 + 0.25n \rightarrow 0.25n + 20$

Example:

In Langley, BC you can rent a backhoe for $399 per day and a bulldozer for $550 per day. It costs $160, round trip, to move each piece of equipment to the job site.

a) Use a variable to represent the number of days you will be renting the backhoe. Write an expression for the total cost of renting the backhoe, before tax. Include transportation to and from the job site.

let d represent the # of days

$399d + 160$

Example:

In Langley, BC you can rent a backhoe for $399 per day and a bulldozer for $550 per day. It costs $160, round trip, to move each piece of equipment to the job site.

b) Using the same variable, write an expression for the total cost of renting and moving the bulldozer.

$550d + 160$

Example:

In Langley, BC you can rent a backhoe for $399 per day and a bulldozer for $550 per day. It costs $160, round trip, to move each piece of equipment to the job site.

c) What expression would represent the total cost of renting and moving both a backhoe and a bulldozer?
(Simplify your expression by combining like terms)

$399d + 160 + 550d + 160$

$= 949d + 320$

Example:

In Langley, BC you can rent a backhoe for $399 per day and a bulldozer for $550 per day. It costs $160, round trip, to move each piece of equipment to the job site.

d) What expression would represent difference between the cost of renting a bulldozer and renting a backhoe?
(Simplify your expression by combining like terms)

$(550d + 160) - (399d + 160)$

$+ (-399d - 160)$

$= 550d + 160 - 399d - 160$

$= 151d$

Check your understanding:

pg. 197-199
#16, 17, 19, 20, 24, 26, 28

Also, go back to the Section 5.2 Extra Practice sheet and try the two problems on the back side.