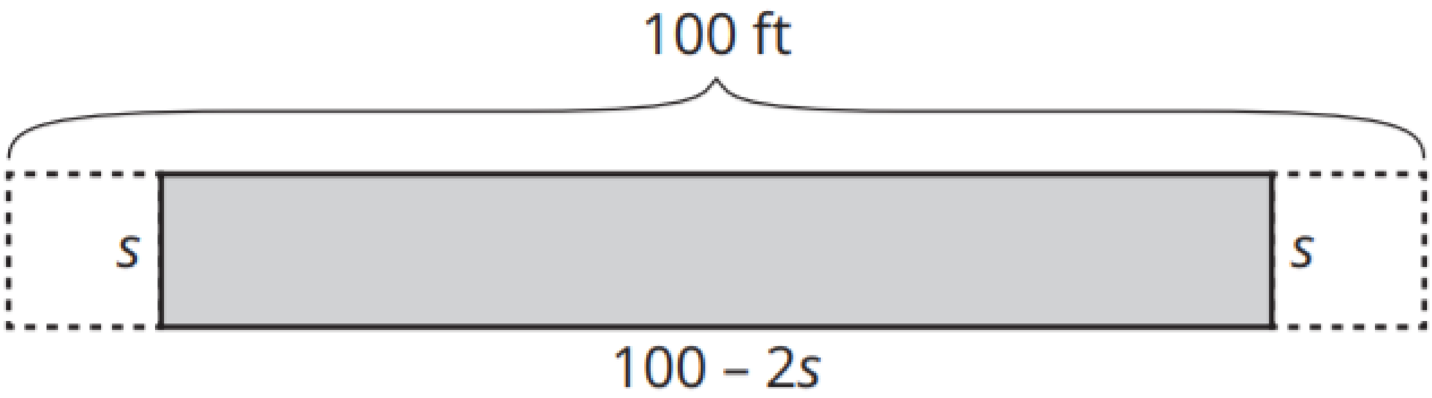
Consider the dog enclosure scenario from the previous topic.



The area of the enclosure is expressed as $A(s) = s(100 - 2s)$, or the product of a monomial and a binomial.

1. **Consider how Jason and Julie wrote an equivalent polynomial function in general form by calculating the product.**

Jason

$\cdot$	100	$-2s$
s	$100s$	$-2s^2$

$A(s) = -2s^2 + 100s$

Julie

$A(s) = s(100 - 2s)$

$A(s) = 100s - 2s^2$

$A(s) = -2s^2 + 100s$

a. **Describe the strategy Jason used to calculate the product.**

b. **How is Jason's strategy similar to Julie's strategy?**

Consider the ghost tour scenario from the previous topic. The revenue for the business is expressed as the product of a binomial times a binomial.

Revenue	=	**Number of Tours**	·	**Price per Tour**
↓		↓		↓
$r(x)$	=	$(10x + 100)$	·	$(50 - x)$

2. Finish Jason's process to write an equivalent polynomial function for revenue in general form.

·	**50**	$-x$
$10x$	$500x$	$-10x^2$
100		

3. Use an area model to calculate the product of each polynomial. Write each product in general form.

a. $(3x + 2)(x - 4)$

b. $(x - 5)(x + 5)$

c. $(2x + 3)^2$

d. $(4x^2 + x - 1)(3x - 7)$

In Question 1, Julie uses the Distributive Property to multiply a monomial and a binomial. She wants to use the Distributive Property to multiply any polynomials.

Worked Example

Consider the polynomials $x + 5$ and $x - 2$. You can use the Distributive Property to multiply these polynomials.

Distribute x to each term of $(x - 2)$, and then distribute 5 to each term of $(x - 2)$.

$$(x + 5)(x - 2) = (x)(x - 2) + (5)(x - 2)$$

$$= x^2 - 2x + 5x - 10$$

$$= x^2 + 3x - 10$$

4. Use the Distributive Property to determine each product. Write the polynomial in general form.

a. $(5x - 1)(2x + 1)$

b. $(x - 7)(x + 7)$

c. $(x + 2)(x - 9)$

d. $(2x^2 + 1)(3x^2 + x - 1)$

5. Explain the mistake in Cheyanne's thinking. Then determine the correct product.

Cheyanne

$$(x + 4)^2 = x^2 + 16.$$

I can just square each term to determine the product.

6. Based on the definition of closure, are polynomials closed under the operation of multiplication? Justify your answer.

1. Determine each product.

a. $(x - 4)(x + 4) =$ ____________

$(x + 4)(x + 4) =$ ____________

$(x - 4)(x - 4) =$ ____________

b. $(x - 3)(x + 3) =$ ____________

$(x + 3)(x + 3) =$ ____________

$(x - 3)(x - 3) =$ ____________

c. $(3x - 1)(3x + 1) =$ ____________

$(3x + 1)(3x + 1) =$ ____________

$(3x - 1)(3x - 1) =$ ____________

d. $(2x - 1)(2x + 1) =$ ____________

$(2x + 1)(2x + 1) =$ ____________

$(2x - 1)(2x - 1) =$ ____________

In Questions 1 and 3, you should have observed a few special products. The first type of special product is called the *difference of two squares*. The **difference of two squares** is an expression in the form $a^2 - b^2$ that has factors $(a - b)(a + b)$.

4. Label the expressions in Questions 1 and 3 that are examples of the difference of two squares.

The second type of special product is called a *perfect square trinomial.* A **perfect square trinomial** is an expression in the form $a^2 + 2ab + b^2$ or the form $a^2 - 2ab + b^2$. A perfect square trinomial can be written as the square of a binomial.

$$a^2 + 2ab + b^2 = (a + b)^2$$
$$a^2 - 2ab + b^2 = (a - b)^2$$

5. Label the expressions in Questions 1 and 3 that are examples of perfect square trinomials.

6. **Use special products to determine each product.**

a. $(x - 8)(x - 8)$

b. $(x + 8)(x - 8)$

c. $(x + 8)^2$

d. $(3x + 2)^2$

e. $(3x - 2)(3x - 2)$

f. $(3x - 2)(3x + 2)$