Simplify.

1. $(x - 2)(x - 2)$
2. $(y - 2)(y + 9)$
3. $(z - 2)(z - 6)$
4. $(3x + 4)(x + 6)$
5. $(4x - 6)(4x - 10)$
6. $(4a + b)(3a + 6b)$

Warm Up

Warm up: Multiplication

1) $x^2 - 4x + 4$

3) $z^2 - 8z + 12$

5) $16x^2 - 64x + 60$

6) $12a^2 + 27ab + 6b^2$

Write an absolute value equation that has the given solutions.

1. $x = 9$ and $x = 17$
2. $x = 3$ and $x = 8$
3. $x = 5$ and $x = 16$
4. $x = -3$ and $x = 10$
5. $x = -5$ and $x = 3$
6. $x = -2$ and $x = 1$

Cumulative Warm Up

Skip

$(a+b)^2$

$(a+b)(a+b)$

$a^2 + ab + ab + b^2$

$a^2 + 2ab + b^2$

* divide students up to explore *

Essential Question

What are the patterns in the special products $(a + b)(a - b)$, $(a + b)^2$, and $(a - b)^2$?

$(a-b)(a-b)$

$a^2 - b^2$

$a^2 - 2ab + b^2$

Essential Question

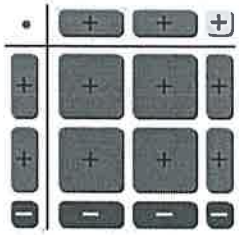
What you will learn:

- Use square of a binomial pattern
- Use the sum and difference pattern
- Use special product pattern to solve real life problems.

Work with a partner. Write the product of two binomials modeled by each rectangular array of algebra tiles.

a. $(x + 2)(x - 2) =$

b. $(2x - 1)(2x + 1) =$



Exploration 1

* Skip? *

Work with a partner. Draw the rectangular array of algebra tiles that models each product of two binomials. Write the product.

a. $(x + 2)^2 =$

•	x	$+2$
x	x^2	$2x$
$+2$	$2x$	4

$x^2 + 4x + 4$

b. $(2x - 1)^2 =$

•	$2x$	-1
$2x$	$4x^2$	$-2x$
-1	$-2x$	$+1$

$4x^2 - 4x + 1$

Exploration 2

* use area model

Core Concept

Square of a Binomial Pattern

Algebra	Example
$(a + b)^2 = a^2 + 2ab + b^2$	$(x + 5)^2 = (x)^2 + 2(x)(5) + (5)^2$ $= x^2 + 10x + 25$
$(a - b)^2 = a^2 - 2ab + b^2$	$(2x - 3)^2 = (2x)^2 - 2(2x)(3) + (3)^2$ $= 4x^2 - 12x + 9$

Core Concept

* basic definition

* practice area model

Find each product.

a. $(3x + 4)^2$ b. $(5x - 2y)^2$

$(3x+4)(3x+4)$ $(5x-2y)(5x-2y)$

Example 1

* remember the exponent affects the base, the base is everything in the parenthesis.

* discuss short cut.

Find the product.

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

3. $(4x - y)^2$ 4. $(3m + n)^2$

Monitoring Progress 1-4

* Student practice

Core Concept

Sum and Difference Pattern

Algebra	Example
$(a + b)(a - b) = a^2 - b^2$	$(x + 3)(x - 3) = x^2 - 9$

Core Concept

* difference of two squares.

Find each product.

a. $(t + 5)(t - 5)$ b. $(3x + y)(3x - y)$

Example 2

* use area model

* discuss short cuts

Use special product patterns to find the product $26 \cdot 34$.

$(30-4)(30+4)$

$30^2 - 4^2$

$900 - 16$

884

Example 3

Find the product.

5. $(x + 10)(x - 10)$ **6.** $(2x + 1)(2x - 1)$ **7.** $(x + 3y)(x - 3y)$

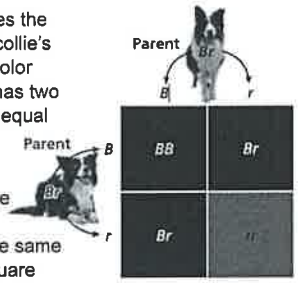
8. Describe how to use special product patterns to find 21^2.

Monitoring Progress 5-8

Student practice

A combination of two genes determines the color of the dark patches of a border collie's coat. An offspring inherits one patch color gene from each parent. Each parent has two color genes, and the offspring has an equal chance of inheriting either one.

The gene *B* is for black patches, and the gene *r* is for red patches. Any gene combination with a *B* results in black patches. Suppose each parent has the same gene combination *Br*. The Punnett square shows the possible gene combinations of the offspring and the resulting patch colors.



Example 4

a. What percent of the possible gene combinations result in black patches?

75%

b. Show how you could use a polynomial to model the possible gene combinations.

$= (.5B + .5r)^2$

$= .25B^2 + .5Br + .25r^2$

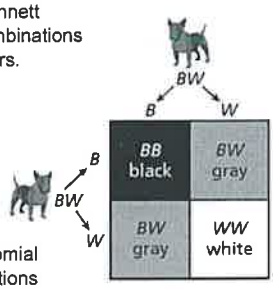
25% BB; 50% Br; 25% rr

Example 4a-b

9. Each of two dogs has one black gene (*B*) and one white gene (*W*). The Punnett square shows the possible gene combinations of an offspring and the resulting colors.

a. What percent of the possible gene combinations result in black?

25%



b. Show how you could use a polynomial to model the possible gene combinations of the offspring.

$(.5B + .5W)^2$

$= .25B^2 + .5BW + .25W^2$

Monitoring Progress 9

• **Give Me Five:** "How did today's lesson help you better understand multiplication of binomials?"

Closure