

## 7.3 Multiplying Special Cases

SWBAT expand polynomials in vertex form and simplify them into standard form.

### Expanding Monomials

Expand (do not simplify) each of the following:

a)  $(2xy)^2$

b)  $(5xyz)^3$

c)  $(4x)^4$

### The Square of a Binomial: Do NOT distribute an exponent to a binomial!

Expand, then FOIL or Box the following.

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

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

Expand, and then simplify the following:

a)  $(3x + 4y)^2 =$

b)  $(x - 3)^2 =$

**Got it?** What is the simpler form of each product?

a)  $(2x + 9)^2$

b)  $(n - 4m)^2$

### Expanding a Binomial in Vertex Form

What is a simpler form of each product?

a)  $2(x - 6)^2$

b)  $3(x + 2)^2$

c)  $4(x - 1)^2$

What is a simpler form of each product?

a)  $3(x+1)^2 + 1$

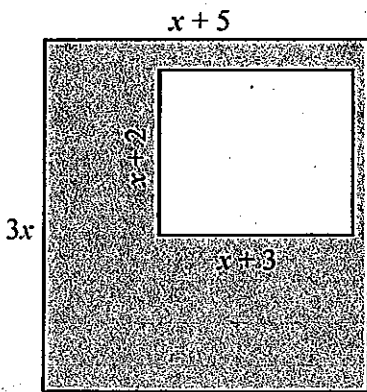
b)  $2(x-4)^2 - 5$

c)  $-4(x-2)^2 + 6$

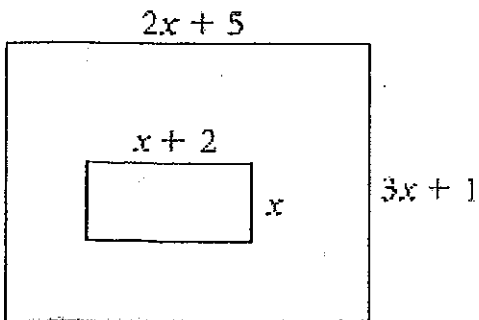
Finding Area of Shaded Regions

**Area shaded = Area Big - Area Little**

Find the area of the shaded region below. Show all work.



Find the area of the shaded region below. Show all work!



Key

# 7.3 Multiplying Special Cases

Standard ASSE.2

SWBAT expand polynomials in vertex form and simplify them into standard form.

### Expanding Monomials

Expand (do not simplify) each of the following:

a)  $(2xy)^2$

$2xy \cdot 2xy$

~~2xy~~

b)  $(5xyz)^3$

$(5xyz)(5xyz)(5xyz)$

125xyz

c)  $(4x)^4$

$(4x)(4x)(4x)(4x)$

### The Square of a Binomial: Do NOT distribute an exponent to a binomial!

Expand, then FOIL or Box the following.

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

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

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

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

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

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

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

Expand, and then simplify the following:

a)  $(3x+4y)^2 =$

	$3x$	$4y$
$3x$	$9x^2$	$12xy$
$4y$	$12xy$	$16y^2$

$9x^2 + 24xy + 16y^2$

b)  $(x-3)^2 =$

$(x-3)(x-3)$

$x^2 - 6x + 9$

Got It? What is the simpler form of each product?

a)  $(2x+9)^2$

	$2x$	$9$
$2x$	$4x^2$	$18x$
$9$	$18x$	$81$

$4x^2 + 36x + 81$

b)  $(n-4m)^2$

	n	-4m
n	$n^2$	$-4mn$
-4m	$-4mn$	$16m^2$

$n^2 - 8mn + 16m^2$

### Expanding a Binomial in Vertex Form

What is a simpler form of each product?

a)  $2(x-6)^2$

$2(x-6)(x-6)$

$x^2 - 6x - 6x + 36$

$2(x^2 - 12x + 36)$

$2x^2 - 24x + 72$

b)  $3(x+2)^2$

$3(x+2)(x+2)$

$3(x^2 + 4x + 4)$

$3x^2 + 12x + 12$

c)  $4(x-1)^2$

$4(x-1)(x-1)$

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

$4x^2 - 8x + 4$

What is a simpler form of each product?

a)  $3(x+1)^2+1$

b)  $2(x-4)^2-5$

c)  $-4(x-2)^2+6$

$$\begin{aligned} & 3(x+1)(x+1) + 1 \\ & 3(x^2 + 2x + 1) + 1 \\ & 3x^2 + 6x + 3 + 1 \\ & 3x^2 + 6x + 4 \end{aligned}$$

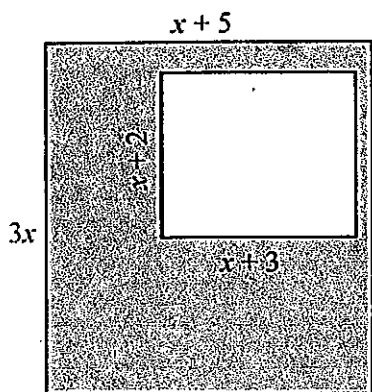
$$\begin{aligned} & (x-4)(x-4) \\ & x^2 - 4x - 4x + 16 \\ & 2(x^2 - 8x + 16) - 5 \\ & 2x^2 - 16x + 32 - 5 \\ & 2x^2 - 16x + 27 \end{aligned}$$

$$\begin{aligned} & (x-2)(x-2) \\ & -4(x^2 - 4x + 4) + 6 \\ & -4x^2 + 16x - 16 + 6 \\ & -4x^2 + 16x - 10 \end{aligned}$$

Finding Area of Shaded Regions

**Area shaded = Area Big - Area Little**

Find the area of the shaded region below. Show all work.

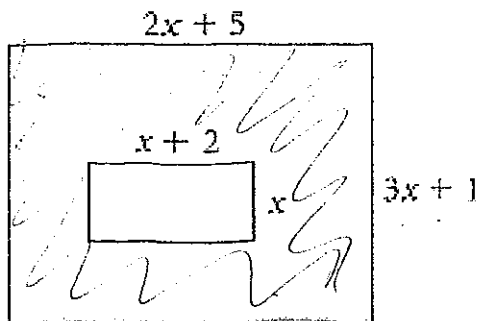


$$A_{BIG} : 3x(x+5) = 3x^2 + 15x$$

$$A_{SMALL} : (x+3)(x+2) = x^2 + 3x + 2x + 6 = x^2 + 5x + 6$$

$$\begin{aligned} & 3x^2 + 15x - (x^2 + 5x + 6) \\ & 3x^2 + 15x - x^2 - 5x - 6 \Rightarrow \boxed{2x^2 + 10x - 6} \end{aligned}$$

Find the area of the shaded region below. Show all work!



$$A_{BIG} : (2x+5)(3x+1) = 6x^2 + 15x + 2x + 5 = 6x^2 + 17x + 5$$

$$A_{SMALL} : (x+2)(x) = x^2 + 2x$$

$$\begin{aligned} & 6x^2 + 17x + 5 - (x^2 + 2x) \\ & 6x^2 + 17x + 5 - x^2 - 2x \\ & \Rightarrow \boxed{5x^2 + 15x + 5} \end{aligned}$$